California Journal

OF SECONDARY EDUCATION

This Month

- Controlling High School Athletics
- The All-Purpose Homemaking Room
- Teaching Social Studies to Poor Readers
- Future Teachers Now in High School
- Pupils Evaluate a Core Class
- Current Events and Materials in Music Education

A Symposium on

SECONDARY SCHOOLS FACE THE CRISIS IN SCIENCE MANPOWER

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Symposium Next Month

ISSUES AND PROBLEMS IN REVISING THE CREDENTIAL STRUCTURE IN CALIFORNIA

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A Symposium Next Month on Issues and Problems in Revising the Credential Structure in California

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EDITORIAL

EDUCATION BEYOND HIGH SCHOOL

Last year President Eisenhower appointed a committee of distinguished laymen and educators to look into the problem of "education beyond high school" in the United States. The unprecedented increase in birthrate, which commenced in the forties, and all but engulfed the elementary schools, is now beginning to overwhelm the secondary schools. Post-high school education is next in line to receive the impact. The President is wisely looking ahead, recognizing the necessity for careful planning to meet the crisis that all post-high school institutions surely face when these new millions begin pouring out of the American high school. Without such planning either there will simply be no room to accommodate these youth or institutions will succumb to the pressures of the moment and expand expediently without regard for the quality of education offered—in either event educational opportunity would be seriously damaged.

The President's Committee on Education Beyond High School has just issued its *First Interim Report to the President* which deserves serious study. Copies may be obtained by writing to the President's office in Washington, D.C. Deveraux C. Josephs, Chairman of the committee, has invited response, criticism, and suggestions so that a new, more substantive report may be formulated.

Since education beyond high school is so intimately linked with education in high school, we urge secondary school teachers and administrators to secure a copy of this report, to study and discuss it, and to send reactions to the committee. It is important that the voice of secondary education be heard in this debate. Long remembered will be the lasting effect on high schools of the report of the famous Committee of Ten which was formulated mainly by those from the colleges and universities. The programs of secondary education and those of post-secondary education strongly influence each other. Their destinies are inseparably linked. The quality of secondary education has always been conditioned by the nature and degree of control exercised by the colleges and universities. The possibilities for an educational program of high degree in the post-high school institutions is fundamentally limited by and must be based upon the kind of secondary education that students receive.

The committee states six preliminary conclusions from its deliberations to date:

1. "Our ideals and the increasing complexity of our civilization require that each individual develop his or her talents to the fullest."

In discussing this, the committee comes quickly to the heart of the issue in so far as the secondary schools are concerned when it states that

"we must find ways of eliminating the waste of talent inherent in the fact that tens of thousands of our superior high school graduates do not go on to colleges." To remedy this, the committee calls for better and more extensive guidance facilities. This is good as far as it goes. But the report fails to state that the most urgent need in high school is for a more adequate curriculum, more inspired instruction by highly competent teachers working under conditions that permit and demand creative teaching.

2. "The needs of the individual and of society plus an unprecedented growth in the population of post-high school age will far outrun the present or planned capacity of existing colleges and universities and other post-high school institutions."

This is a warning that our present institutions are inadequate in number and that we cannot get along in the years ahead simply by expanding them.

3. "The needs of the oncoming millions of individuals with varying capacities and interests will call for a broader range of educational opportunities, and less rigid time requirements."

This pronouncement must seem strange to foreign observers of the American educational scene who already comment critically concerning the motley character of the educational program of our colleges and universities. The committee emphasizes a point of particular importance to Californians: "The growth of community and junior colleges is a significant development of our educational system in this century and is probably the next logical step in filling in and rounding out our educational system." It warns, however, against the pressure to expand these into four-year institutions, or for them merely to become replicas of the first two years of the university. The report cogently pleads for breaking the "time" lockstep so that those of varying capacities and talents, and programs essentially different in character, be not confined to the same rigid four-year procrustean academic bed. The committee warns, but not eloquently or extensively enough, against diluting education while we are in the process of expanding its scope and increasing the pace at which students proceed.

4. "Many more able and qualified teachers will be needed than present efforts can provide."

Attention is directed to efforts to increase the efficiency with which we now use teachers and to the necessity for greatly increasing the financial rewards for teachers. Gratifying is the call even in this brief statement for equal attention to the problem of securing qualified teachers in elementary and secondary as well as in post-high school institutions.

5. "There must be promptly formulated an explicit, considered policy as to the role of the Federal Government in education beyond high school."

The Federal Government now participates in post-high school education in many but often uncoordinated ways. This should be remedied at once.

6. "Even with the best possible utilization of existing resources, additional financial support must be provided if the additional millions in the population are to be enabled to develop their talents to the fullest."

Education beyond high school, which is a many faceted segment of American education, is likely to be the most rapidly growing one in the next few decades. It is the logical capstone to the American educational system that we have been building for over three hundred years. It is based upon the idea that education is indeed "lifelong learning" and that appropriate institutions and programs should be available to all who wish to and can profit from instruction. We believe strongly in the United States that our institutions should be shaped to fit our people, not the other way around. Post-high school education is based upon the idea that as many channels as possible shall be kept open as long as possible for as many as possible. This is in direct opposition to the concept held until very recently in most other parts of the world, and particularly in the western world, where the view for both secondary and post-secondary education is that of rigorous selection and elimination. This difference is in part why we have been charged by those from other parts of the world as shallow and lacking in standards. However, the American experience leads us to conclude that for the culture as a whole, more creative energy will be released by encouraging more persons to continue their education than by discouraging as many as possible at each point along the way. This is our conviction especially when we note the pitifully small numbers who are able or willing to force their way up through the highly selective educational systems found elsewhere in the world. There should be nothing incompatible with the view of encouragement and opportunity held in this country and that of obtaining the highest possible quality and standards in the work performed. Indeed, this is precisely where our challenge lies. We hope that the committee will direct its attention in a substantive way to the directions needed to improve the quality and the efficiency of the educational program. This notable lack in the preliminary report, perhaps inevitable because of its brevity, should be remedied by full debate on the content and the method of education beyond high school.

There seems to be a growing agreement among us that we cannot continue business in the same old way with the same old methods. New and perhaps even radical changes are impending. We seem to be taking a more searching look at what we are doing. We are beginning to ask ourselves some of the very questions that others in the world have been asking about us. We are entering into a period of most constructive change, not change that merely apes practices abroad. Having achieved the inclusion of a large proportion of our population in schools for a substantial number

of years—during which time our main problem has necessarily been on the quantative side, I sense that we are giving increased attention to the even more important issue of the *quality* of the educational experience. This challenge of quality is the new and expanding frontier of American education.

R. N. B.

RUSSIAN EDUCATION

American educators, aware of the important role of education in maintaining a strong, free democracy, have watched the U.S.S.R. with great interest as she has advanced in a period of forty years to become the second industrial power of the world. Accompanying this tremendous industrial gain have been major strides in the field of education:

- With an illiteracy rate of almost 90 percent prior to World War I, the Soviets have probably increased literacy to over 90 percent of the population.
- The Soviets are graduating almost twice as many technical specialists in some fields as is the United States.
- In 1955 the Soviet Union graduated some 116,000 students in all scientific fields, as compared to 78,000 in the United States.

The totalitarian methods of the Soviet Union are antithetical to our democratic ideals, but we might well examine Russian advances for ideas adaptable to our system. Americans who have observed the Soviet system suggest:

- *Changes in curriculum and school organization where needed.* Homer and Norton Dodge point out the lack of scientific courses being offered in schools today. Other authorities agree that America falls short, especially in preparing its talented youth for further education and research. Former Senator William Benton suggests that students could learn history, science, and mathematics from "master" teachers through the use of films and educational television to alleviate problems caused by shortages. He also suggests that educators consider increasing the length of the school day and school year to cut down the number of years of required schooling.
- *More comprehensive scholarship programs.* In America "probably between one fifth and one quarter of the nation's undergraduates are receiving scholarships . . . about one quarter of these . . . restricted to students in scientific and engineering fields."
- *Expanded guidance programs and school placement services.* Although Russian students have the right to choose their training courses, where labor shortages exist in a specific trade the state has the power to conscript them for the designated trade. Our answer, in contrast, lies in expanded guidance and placement services by which students, of their own free will, are helped to make wise occupational choices and educational plans.

America's educational goal is a worthy one: to help every child develop his abilities. There is no inherent reason why we need to produce as many engineers as Russia, who has had to make up for a tremendous lag in her economic system. Nor, normally, do we need to be alarmed about future shortages if we as guidance people do everything possible to guide every student into the field for which he is best suited and to provide the educational opportunities necessary to permit him to contribute his full potential to that field.

—Lyle M. Spencer
Director, Science Research Associates

A High School Athletic Policy Board

By RAY CHARLSON

Are you concerned with problems of interscholastic athletics in your school? A constructive solution to many typical problems in this field appears to have been found in southern California. It is here reported by Raymond Charlson, Assistant Principal, Culver City High School, Culver City, California.

This article describes a faculty-student board, called the Athletic Policy Board, which has operated successfully. If the answer for your high school to any of the questions below is "no," then this article may have some value to you:

Do you have a definite agreement in your school as to proper training regulations for athletes?

Do you have a consistent procedure as to how violations of training shall be handled?

Do you have a faculty-student group or committee organized to discuss and decide on all problems related to school athletics?

Do your athletic coaches meet regularly to iron out differences and difficulties concerning the athletic program?

Lest you might start off by thinking that the Athletic Policy Board is some educative version of the "crystal ball," and always comes up with the right answer, let me hasten to say that all the problems hinted at in the above questions do not get solved. But much in the way of working toward a solution and keeping problems from developing can be credited to a soundly working Athletic Policy Board. What then is an Athletic Policy Board, or, at least, what is the writer's version of one? It can best be explained by telling briefly the very short history of the Athletic Policy Board at Venice High School, one of the Los Angeles City schools.

In the spring of 1954, the writer and another coach in the school were discussing the point that coaches vary in their attitude toward training regulations in athletics, and, as a result, the athletes in coming under various coaches are not always certain as to what is required; and, worse yet, some coaches are branded as being unduly tough while others are considered soft where training regulations are concerned. Out of the conversation developed the idea that a possible answer might be a board made up of faculty and students before which discipline and training problems relating to individual athletes might be brought for decision and action. Not long after the conversation mentioned, the idea for a board along the lines de-

scribed was presented to the principal, boys' vice-principal, and the athletic coaches. There was enthusiasm for it and, best of all, the principal was sold on the idea and encouraged further work on it. A committee was formed with the boys' vice-principal heading it, and after several meetings the organizational plan stating the purpose and function and regulations for the Athletic Policy Board was established. It might be mentioned here that during the formative stage student viewpoints were asked for, but the plan was actually worked out by the faculty. Perhaps such procedure can be criticized, but in defense let it be said that the original aim was to establish a better means of doing a job through a board, whereas previously it had been done by coaches.

The organization plan for the board was not elaborate, yet it seemed to cover our needs. The fact that it has served its purpose for a full year, and that contemplated changes for the next year, with one exception, were minor, indicate that the plan is a good one. The main sections of the organization plan are the following:

Personnel of the Board. The members of the board consisted of boys' vice-principal as chairman, head of the boys' physical education department, athletic coordinator (a faculty member), a coach from each sport in season during the semester, two student members, the Student Body president, and the Boys' League president. The extreme imbalance in favor of faculty is very apparent, but in defense of it, it should be said that the board originally was thought of as a faculty board. For the second year the definite plan is to move toward equal balance between student and faculty membership on the board.

Time of Meeting. A minimum of one meeting each month, before school, was decided. But the work of the board grew so important that for the major portion of the first year it met once a week and sometimes more than that. If attendance of members indicates success, then the board has been highly successful, for absence of a member was rare. With very few exceptions all meetings are open to the student body.

Purpose and Function. The purpose and function of the board is stated in the written plan:

> The purpose of this board is to work with the students, faculty, and other personnel of Venice High School to help promote and better our school's athletic traditions, customs, and policies. The Athletic Policy Board shall have jurisdiction in all matters of athletics relating to eligibility, citizenship, training policies, awards, and miscellaneous problems in the athletic program. It shall be the intent of this board to handle all cases brought before it, in an honest, fair, and unprejudiced manner, keeping in mind at all times the purposes stated above. Any athlete, coach, teacher, or other personnel of Venice High School who presents a bona fide case over which the board has jurisdiction will be heard, and to the best of its ability, the decision required by the board will be considerate and consistent with good judgment and fair play, regardless of personalities or influences involved.

How to Get a Hearing Before the Board. This part dealt with bringing before the board any problem or appeal which was in the realm of athletics. No strict formality was held to, for the board wished to remain practical and flexible.

The remainder of the plan established general training regulations for all athletes of the school, and described the attitude of the student body regarding citizenship. The training regulations mentioned specifically the use of or possession of tobacco or alcohol, on or off the campus. As regards citizenship, the regulations gave support to evaluations of citizenship in the classroom by teachers, and also explained that other cases of poor citizenship would be considered on an individual basis. Insofar as scholastic requirements for participation in athletics are established by the Board of Education, the board assumed no prerogative here.

In discussing how the program might best be presented to the boys of the school, it was suggested that a "code for athletes" be drawn, and that each boy who participated in athletics asked to sign. The thought was that a "code for athletes," expressed in idealistic language and containing a promise to abide by the rules of the game and of training, might focus the boys' attention on an aim of the athletic program which seems to be getting less stress in present-day interscholastic athletics. With faculty and students working together, the following code entitled: "Code of an Athlete" was drawn.

CODE OF AN ATHLETE
VENICE HIGH SCHOOL

I believe that as an athlete of Venice High School I represent the finest in American youth.

I believe that the privilege of wearing a Venice High Athletic uniform carries with it the responsibility of being a gentleman and sportsman on the playing field, on my school campus, and in my community.

I believe in the ideals of sportsmanship and athletics described below and I pledge myself to promote them continually in my school's athletic program.

I will play fair, I will play hard, but I will keep a level head.

I will be a team worker, playing for the joy of playing and for the success of the team.

I will keep training rules, and a healthy body, thereby justifying the trust that my teammates place in me.

I will obey orders from my coach and from my captain.

I will do my best in all school work.

I will treat visiting players as guests.

I will give my opponents a square deal.

I will respect customs, traditions, and alma mater of opposing schools.

I will respect game officials, expect them to enforce the rules, and accept adverse decisions graciously.

If I lose, I will congratulate the winner, give him full credit for winning and try to profit from my defeat.

If I win, I will be generous, modest and considerate.

I will at all times be true to my highest ideals.

I have read the above code and pledge myself to live up to its high standards to the best of my ability.

Signed.....
Student's Signature

I have read the General Policies of the Venice High School Athletic Policy Board, and agree to abide by these rules and regulations.

Signed.....
Student's Signature

Date....., 195..

The next step in activating the board was to introduce it during the first week of the fall semester to the boys who were planning to participate in athletics. All boys out for athletics met during the last period of the day for practice. So the meeting was scheduled at that time. Members of the board, including students, explained the organization, function, and purpose of the board. The training, citizenship, and scholastic regulations were read and explained to the boys and the "Code of an Athlete" was also read. The atmosphere was relaxed and yet an air of informal ceremony was maintained. Then each coach gave each member of his squad a copy of the "Code of an Athlete" and asked him to sign, indicating that he agreed to abide by the standards voiced in the code, and further that he agreed to abide by the regulations established by the Athletic Policy Board.

Some might argue that asking boys to sign a code for athletes and promise to follow rules pertaining to training citizenship and scholarship introduces compulsion because boys will sign to go out for the team regardless of a belief in the code or the rules. Boys might well do this. But in answer to criticism of our approach to the problem it seems fair to remind the critics that the ideals of the code are of long standing and general acceptance in athletics, and the rules are reasonable ones for all athletes. It also appears to the writer that those things contained in the code need more stressing in these days when not only colleges, but high schools, seem all too concerned with gate receipts and a winning team.

Through good fortune, or careful planning and conscientious membership, the board functioned well from the beginning. It was immediately accepted by the athletes. The earliest cases heard by the board were those of boys charged with violation of training rules. Where evidence clearly indicated that rules had been violated, athletes were declared ineligible for

the remainder of the semester and denied any awards which might have been earned. In all such cases the boys were urged to have spokesmen or counsel of their own choosing, and to have their parents present at hearings. No outward sign of resentment among students has been noted when an athlete has been declared ineligible. In private conversation with boys of the school who are not timid in giving opinions, the writer discovered that the board and its actions were highly respected. Two early cases helped to sell the board to the students. Both were cases where boys had been denied the right to participate in athletics because of poor citizenship. In each of these cases the board heard the boys' appeals, realized that misunderstanding had caused the original suspension (which had been made prior to the board's formation), and ruled in favor of their participating again.

Not long after the board began functioning it became apparent that its major function was to be much more than ruling on cases of athletes. It soon became a standing committee for discussing and attempting to solve most of the problems related to the entire athletic program. To the principal's delight it became a strong, functioning group to which he could turn for information and decision on a multitude of problems regarding athletics that arise in any large high school. It was at this stage that meetings became more frequent, and soon were scheduled once a week. Gradually the scope of the board's functions widened even more and ideas for the improvement of athletics in the school were presented to the board. Following are examples on which the board took action: in cooperation with a student committee a varsity lettermen's club was established; a school athletic hall of fame was planned and actual work begun; a beginning was made on the compiling of a sports almanac which, when finished, will contain all athletic records and achievements of note in the entire history of the school; and a managers' club for athletics was planned which will go into action this year.

Another good service of the board was that it became a recognized place for the coaches to bring grievances or major problems relating to the athletic program. And in most cases, solutions agreeable to all were developed. For some schools this could easily be the greatest service such a board could render. In our school problems between coaches have never been serious. Perhaps because of this the board was able to function quite smoothly from the start.

The board has functioned smoothly and with force for an entire year. It has gained respect and developed good standard procedures. From the many discussions and decisions made throughout the year guiding principles have emerged which will continue to be of service in the future when problems arise. The board now has at its disposal a body of knowledge which has grown out of its experience. Improvements will continue. The immediate one will be to bring more students into membership on the board. When this is accomplished the board will stand as an excellent example of student-faculty cooperation in the operation of the school. In reviewing

the beginning and development of the board, the following actions, attitudes, and safeguards helped considerably in its success:

1. The idea for the board came from outside of the administration.
2. From the beginning planning was done by the group.
3. The principal gave the idea his blessing and encouragement.
4. The boys' vice-principal worked hard with the group and was most faithful in scheduling and attending meetings.
5. Capable student leaders contributed much to the discussion and decisions of the board, and the meetings were open to students.
6. The board was given authority as well as responsibility.
7. The board at all times was thorough, fair, and sought the best for the students and the school.
8. The board was willing to increase its work load as its responsibility increased.

A NEW LOOK AT MATH AND SCIENCE ENROLLMENTS

Recent articles focusing national attention on the shortage of scientists and engineers have tended to exaggerate our lack of high school math and science enrollments, according to a new study recently released by the Office of Education. While the new figures, based on enrollments in public high schools in 1954–55, do not imply that the number of students enrolled in these courses is sufficient to meet the current demand for scientifically trained personnel, they do present a more accurate estimate of our future supply.

Misinterpretations of current enrollments, the report states, may have been caused by the method used in determining percentages. Some studies have compared the number of students taking a course to the total high school enrollment rather than to the number of students in the grade in which the course is normally given. In the fall of 1954, for example, 23.5 percent of the students in the twelfth grade were enrolled in physics. When the number taking physics is compared to the total high school enrollment, however, it equals only 4.6 percent. The Office of Education feels that the former base gives a truer picture of how many youngsters actually take the course.

Here are the enrollments reported by the Office of Education:

Subject	*Percent enrolled**
Biology	72.6
Chemistry	31.9
Physics	23.5
General math	44.5
Elementary algebra	64.5
Plane geometry	37.4
Intermediate algebra	28.5
Trigonometry and solid geometry	13.0

* *In grade where course is normally given.*

While the *percent* of students enrolled in most of these courses has remained constant or decreased in the last fifty years, the actual *number* of students has increased in all courses but geometry.

—Guidance Newsletter, October 1956

Future Teachers in the Making

By BETTY LUND

Secondary schools in Bakersfield have long been pace-setters in California. This article illustrates the type of creative approach to educational problems characteristic of this outstanding school system. If this approach to the problem of recruiting teachers were taken in secondary schools throughout the State and the nation, a MAJOR breakthrough toward its solution would soon be achieved. Miss Betty Lund is a counselor at North High School, Kern County Union High School and Junior College District, Bakersfield, California.

Thirty-eight million Americans, 23 percent of the entire population, are now attending school. By 1960 this figure is estimated to jump to forty-six million. This year's nationwide enrollment increase over last year was estimated as 5.6 percent at the elementary level and 3.0 percent at the high school level. The current teacher shortage is listed at 166,900 teachers. What will this figure be in five years when twelve million additional students are ready for education?

Additional teaching personnel for the year 1960 will come from students who are juniors and seniors in high schools today. Here is the resource for meeting an acute nationwide problem. Here is the potential for educational advancement. Now is the time to awaken in these high school students the sparks of interest and abilities which might lead to the teaching profession. High school programs must take the lead.

North High School in Bakersfield has a functioning program under way at the junior level. The program had its beginning a year ago when a need for student leaders was presented to the faculty. The need related to the girls' physical education classes whereby some students who had earned a school letter in the Girls Athletic Association program desired to help the physical education teachers in regular classes with refereeing, team drills, and other leadership activities. Faculty consideration of the suggestion brought forth the idea that perhaps students in other departments would be interested in similar leadership experiences. Such a program could be twofold in purpose. First, it would provide students an opportunity to develop particular qualities and capabilities desirable in leadership through a classroom experience under direct supervision of a qualified teacher. These experiences would therefore be different in nature from those leadership experiences made available in club experiences and student body functions. Second, it would provide for the development of those qualities and capabilities necessary for teaching and in that way serve as a practical vocational guidance program for those students who

might be considering the teaching profession as a career. Both students and faculty were enthusiastic as the plan began to evolve.

Interested faculty members went to work in committees to study objectives of such a course, to consider the activities and experiences that would be desirable, and to work out a functional plan for action. Four major objectives were accepted. One, to develop personal traits desirable in the field of education. These personal traits were listed as personal appearance and poise, command of English, industry and perseverance, initiative, reliability and dependability, enthusiasm, patience and tolerance, fairness, creative ability or originality, judgment and common sense. Two, to develop scholarship in a specific field. Subtopics here were listed as knowledge of the subject and application of that knowledge in the chosen teaching field. Three, to initiate the development of a professional attitude. Points of consideration were interest in the art of teaching, interest in students, ability to protfi by criticism, punctuality and reliability, cooperation with teachers, students and other school personnel, and a desire for self-improvement. Four, to provide perspective concerning the teaching profession. This objective would include a study of the routines of safety, light, heat and ventilation, care of equipment, how to organize and prepare subject matter, adjusting to emergency situations, an observation program of a variety of situations, a chance to demonstrate various skills, and experiences in evaluation.

It was decided that the course be called "Student Teaching," that it be listed on the permanent record in that manner and that it be given as full credit as any course in the school curriculum. It was felt that a course of this nature would merit full credit and would certainly be desirable learning experience for students of above average abilities. The course was listed as an elective course for those interested in the teaching profession and students applying to take the course would secure advice and recommendations from a teacher in their chosen teaching field and from their counselor.

The next step was that of finding out which faculty members wished to have a student teacher working under them, and in which class they felt the student should be assigned for the most gain to himself and to the class. After lists were drawn it was decided that junior year student teachers should work in freshman classes and senior year student teachers could work with freshman or sophomore classes. Since this school is only in its second year of operation, its oldest class is in the junior year where the program had its beginning.

Twenty students entered the program. Ten teachers requested student teachers to work under them. Students were assigned to many different fields including English, social science, mathematics, biology, art, homemaking, metal shop, and physical education.

As a part of his daily class schedule, each student teacher in the program reports daily to the assigned class and supervising teacher. He works daily with that class and supervising teacher throughout the entire semester. In addition, all student teachers in the program come together every other

week for group meetings with the faculty advisor in charge. These group meetings provide opportunity to discuss common problems and consider phases of the profession that the student teachers wish to consider. During the semester each student teacher develops some project in conjunction with his own teaching field which will in some way supplement the teaching program. It can be a visual aid, a mechanical device, a written project, or anything that may be used as a teaching aid.

Biweekly group meetings during the first semester of the program covered many topics. The first meeting centered on a discussion of those personality traits that make a good teacher. The second meeting followed a two-week period in which student teachers observed classes other than their own. They visited at least two different classes, one in their own department and one in another department, looking for different techniques of instruction and other ways of handling situations. In the group meeting following these observations they discussed what they saw and compared the number of different ways of doing things. Another group meeting concerned emergency discipline situations that arise in the classroom. Specific incidents were described and the student teachers talked about possible ways of dealing with them. The high school attendance supervisor and dean of men both attended the meeting and presented enlightening points. In another group meeting, a counselor from the junior college spoke to the group and answered questions regarding college plans, degrees, finances, and what was ahead. Teacher activities other than classroom duties provided a topic for discussion at another meeting. Student teachers interviewed key personnel on the staff such as the Faculty Club president, class and club advisors, school paper and yearbook advisors, a person familiar with CTA, NEA and other professional organizations. They brought back answers to: what teachers do outside of class; its value to them and to the students as well as to the profession; how much time it takes. Another meeting discussed and compared different grading systems used throughout the school. Still another centered on a study of bulletin board displays. For this meeting each student teacher planned and constructed a bulletin board in his own classroom where it was rated by the supervising teacher and then by the art teacher in the school on artistic makeup, useful information, and originality. Student teachers brought the ratings and a pencil sketch of the bulletin board to the meeting for the discussion which was led by the art teacher.

Within individual classrooms, student teachers are experiencing many different activities. The following have been included at various times during the semester: take roll, correct papers, grade students' work, prepare and give a test, lead discussions, prepare and give a report on a specific topic, put up a bulletin board, read school announcements and bulletins to the class, prepare a visual aid file, work on filing and labeling of teaching materials, issue students their padlocks, assist in plate-making for science, referee games in physical education classes, circulate around the room giving individual help to students working on assignments, observe particular students over a period of time, get materials ready for the day's

lesson, teach specific assignments or units, evaluate the cheating possibilities during a test, take over the class for a prescribed length of time. The last one listed, taking over the class, varied in duration with every student teacher. Some were hesitant and did not feel ready to handle a thirty-minute unit or a day's lesson. Others, by the end of twelve weeks, requested and actually took over the class for the last six-week unit of the semester, working closely with the supervising teacher in planning and handling situations as they arose. No pressure was placed on student teachers to take over; they assumed more and more responsibility as they and the supervising teacher felt they were ready.

Student teachers stated that the most valuable phase of the biweekly group meetings was getting together to discuss and to compare individual experiences and to learn what others were doing. They requested more speakers on topics concerning the profession and teaching methods. But most of them feel that the greatest value came to them from their daily classroom experiences and working directly with a class and a supervising teacher. On a mid-semester evaluation questionnaire, student teachers said: "Give us more things to do." When asked: "Are you enjoying this program?," all but two answered "Yes." The other two stated "somewhat."

On this evaluation questionnaire students were asked to offer frank comments about the program and to suggest any ideas they could give for improvement or reorganization of the course. The following specific comments were made by student teachers in the program after twelve weeks of experience:

"I thought the teachers had more free time. It keeps you busy just helping the students with their classwork, not counting the grading and time spent with clubs and other problems."

"If a prospective teacher can not adequately get what they want from this course, I think they should think again about becoming a teacher."

"I expected them (experiences) to be what they are, but I didn't realize teaching was such a challenge. I thought it would be terribly boring; but it really isn't. Sometimes I feel like I'm out on a limb and just as soon as I get back on the well-beaten track, I'm back out on a limb again. However, I never knew getting out on a limb could be so interesting."

"Now I know how a teacher must feel—and these experiences have given me a wider scope on many things, not just teaching, but my attitude, and even the girls (referring to a physical education class)."

Faculty supervisors feel the program has a good beginning. Student teachers in the program have been able to suggest experiences they consider as valuable and experiences they would like to see added to the program. It is generally felt that the program merits full attention by faculty and students alike because of its value both to the students and to the teaching profession. It is hoped that the activities described here may serve as guide lines to many high schools in the State of California in order to meet a current need that is statewide as well as nationwide—the need to develop future teachers for the youth of the public schools of tomorrow.

Teaching Social Studies to Poor Readers

By FRANCES HAUSER PARK

Because of the large number of pupils enrolled in social studies courses and their high degree of dependence upon reading skills, this article by a high school teacher should interest Journal *readers. Mrs. Hauser is teacher of social studies, English and remedial reading, Washington Junior High School, Fresno, Calif.*

Pupils have little interest in social studies when they cannot understand the concepts and ideas presented by the printed word. Teaching social studies and English to a group of these disinterested poor readers is my assigned duty and my pleasure. All seventh-grade pupils at Washington Junior High School are grouped homogeneously by standard reading test scores which are administered during the latter part of the sixth grade. Our class consists of thirty-two seventh-graders whose reading test scores ranged from the first grade through the fifth grade. Seventh-grade textbooks and materials are too advanced for these slow learners, indifferent learners, and rebellious learners, so we learn social-studies concepts through three other channels: (1) vision, (2) imagination, and (3) current events.

Success in our three-part program does not require much reading skill. However, it should be emphasized that reading is not neglected in our learning. The program is designed to let each pupil experience success in having learned for himself some new and understandable concept. Words from social studies are frequently used in sound and spelling drills, and stories on low level reading levels are employed often. But, the learning of social-studies concepts would be lost if we used only the laborious channel of reading; therefore, we have developed the program here described. The three divisions of the program which have been made to clarify the functions of each one, are arbitrary. In practice the divisions overlap continually.

Vision

The visual part of the program includes maps, films and film-strips. As we progress through the year, we build an atlas of commercial maps of each of the areas studied: Mediterranean Area, Central and Northern Europe, Russia, Middle East, Far East, South and Central Africa. Also, a free-hand map of each country studied is drawn. Most of the students enjoy art work, so they embellish the cover of their atlases with original designs.

Maps. As each area of the Old World is studied a map of that area is colored and a legend is formulated to assist with the reading of the map. To prevent mistakes and confusion each map is enlarged and colored on the

board by one of the better students. This serves as a guide for coloring individual maps. As each new country is studied a new page is added to the atlas. On this page the country is drawn, beginning with some geometric figure such as a square for Egypt, a triangle for Iraq, a trapezoid for Spain, or a cone for India. Then the figure is modified into a reasonable facsimile of the country. Emphasis is on space relationship as we locate and show on the map the important physical and political features of the country. The flag and historical facts in time-line sequence complete the page.

The position of the country on the world map and on the globe is then very carefully established. Noted are the directions from Fresno that would be followed to reach the country, the best routes by air and ship, and the probable traveling time. This discussion usually develops into imagining a trip to the country and writing about it.

Films and Filmstrips. A second division of the visual program is the frequent and planned use of films and filmstrips. These are preordered from the central film library to fit into the course of study. They show the physical features, the vegetation and animal life, the food, clothing, and shelter of the people, and the customary life. After anticipatory discussion we follow the viewing with more discussion. From this study of films and filmstrips comes a large portion of the imaginative part of this social studies program. With each film or filmstrip the discussion is organized around the challenge: "Let us imagine we are there!"

Imagination

The imaginative part of the program is developed by three means: (a) the films and filmstrips, (b) the discussions based on maps, and (c) the use of many flat pictures as the basis for teacher-directed thinking and discussion. There is a wealth of sources for obtaining excellent flat pictures: old and new textbooks, storybooks, and encyclopedias, airline offices and advertising departments, foreign embassies and tourist bureaus. Addresses with material available are listed in Educators' Progress *Guide to Free Curriculum Materials* and in Field Enterprises' *Sources of Free and Inexpensive Educational Materials.* Useful also are picture magazines such as *Life, Look, National Geographic,* and *Holiday.*

Discussion takes place after each selected picture has been studied silently by the class. Each student is directed in this manner: "Look at the picture; notice the main things and also the background. Think of several ways in which this picture shows how the people in the country live." Thinking is also directed toward the writing of imaginative stories. The teacher reads a story and asks the class to illustrate it with proper attention to dress and background. Or, the beginning of a story may be read and the students asked to think about and write down their thoughts for a continuation and ending of the story. The students are helped with spelling and sentence structure, of course, for this area of work becomes an English lesson.

Current Events

The current-events part of the program is developed through a brief, daily discussion of current happenings in those countries already studied or for which investigations are planned. Discussions include reasons for fortunate and unfortunate happenings, the cold-war camps, the part played by the United States in influencing world opinion, the effects of a fast-moving world upon life in the countries under discussion. Emphasis is placed upon the vital need for bringing the study of other countries up to the present in order to understand that country today, and upon how much more important it is to understand other countries today than in any past time.

Illustrative study—Egypt. A description of the study of Egypt will show how this program functions in the classrom. In practice, no divisions exist: the visual, imaginative, and current events parts of the program function simultaneously.

After having discussed ancient civilizations in general, the route to Egypt is shown on a world physical-political map: we travel east from Fresno, either flying by way of New York and Lisbon, or sailing from San Francisco by way of the Panama Canal and the Strait of Gibraltar; we may possibly travel west but the route would be longer and the nations might not be so friendly. Next, facts of location, climate, and physical features are noted: Egypt is bordered on two sides by water and has a large river flowing through it; the Nile River is introduced as the center of both ancient and modern Egypt, since it has enabled life to flourish in spite of the desert condition—a fact noted on a rainfall map.

We then draw a map of Egypt, beginning with a square. We modify the eastern border, place the correct bodies of water to the north and east, and draw the Nile River in heavily, placing all the important cities on the river. The farm area is shaded, and the rest labeled desert. In drawing the green flag of Egypt, we note that green stands for Mohammedanism, the dominant religion of this area. The map page is completed with a time-line of historical facts as we encounter them in our study.

Suggested Enrichment Materials for Egypt. Many historic and geographic facts are developed through use of the materials listed below:

Films: *Egypt and the Nile* (Encyclopedia Brittanica, color, 16 min.)
Desert Nomads (Coronet, black and white, 30 min.)

Filmstrips: *A Day in Ancient Egypt, Growing Up in Ancient Egypt* (Popular Science, black and white)

Pictures: Egyptian Embassy, Press Dept., Washington 8, D.C.

Books: Fawcett, Raymond, *How Did They Live in Egypt.* (Purnell & Sons, 1953)

Jones, Ruth, *Boy of the Pyramids.* (Random House, 1952)

McGraw, Eloise, *Mara, Daughter of the Nile.* (Coward McCann, 1953)

Meadowcraft, Enid, *Gift of the River.* (Crowell, 1937)

Mills, Dorothy, *Book of the Ancient World for Young Readers.* (Putnam, 1923)

Quinn, Vernon, *Picture Map Geography of Africa.* (Lippincott, 1952)

Stinetorf, L. A., *Children of North Africa.* (Lippincott, 1943)

Taylor, Alice, *Egypt.* (Holiday House, 1953)

Wilbur, S. W., *Egypt and the Suez Canal.* (Wheeler, 1940)

The films, filmstrips, and pictures help in imagining life in ancient and modern Egypt and serve as factual bases for writing about life there. The books provide pictures, information, reading material, and oral reports for selected students, and stories to be read to the class. Throughout the study the slow penetration of modern change into this ancient land is noted. In spite of this, the inevitable influence of a rapidly shrinking world leaves its mark. Its strategic position and role in the cold war have catapulted Egypt into the world limelight. The influence of modern ideas has promulgated revolt and expulsion of monarchy.

For each country the three-part program of vision, imagination, and current events follows a plan similar to that for Egypt. The program appears to be successful for several reasons. Special, directional, and topographical concepts are learned through being presented by maps. Chronological sequence is grasped by using the time-line. Countries become real with familiar people and events, not remote and intangible. Skill is gained in making logical inferences from the facts gathered and retained about each country. Such skills and knowledge have value, both now and later.

STUDY EFFECT OF CLASS SIZE ON LEARNING

A study to find out whether students learn more in large classes taught by highly qualified professors than in smaller classes with relatively inexperienced instructors will be made at Rensselaer Polytechnic Institute through a grant from the Fund for the Advancement of Education. Although conducted at the college level, this study should have implications for high school teaching as well.

The study in teaching methods will be made with 600 sophomores divided into three groups of equal ability, with 200 students in each group. One group will follow the standard method of teaching, with four hours of instruction per week in classes of 20 students each. The other two groups will be divided into sections of 100 students each, one to receive lectures from top faculty members, the other to have both lectures and recitation.

Equal testing at the end of the year will attempt to measure the effectiveness of the different teaching methods.

—Guidance Newsletter, October 1956

Pupils Evaluate Democratic Practices in Multiple Period Classes

By ARTHUR H. MENNES

Since multiple period classes in secondary schools are constantly under discussion, objective data concerning them are always welcome. Arthur H. Mennes is Curriculum Consultant, Madison, Wisconsin Public Schools.

Modification of the secondary school program has brought about various experiments with the pattern of classroom instruction. One of them is the development of the multiple period or longer time block arrangement that combines and unifies two or more subjects which would ordinarily have been taught separately.

This relatively larger block of time provides for a unified course, helps the teacher to become aware of the needs and interests of her pupils and to plan with them units of work which take these needs into consideration.

The purpose of the multiple period is not confined to the mastery of facts and the development of routine skills. The teacher has important obligations of helping students to achieve social and vocational adjustment, of using guidance in every way possible, of developing well-rounded individuals through unified learning experience, and of teaching democratic attitudes and abilities through democratic classroom experiences. Much of the evaluation in the classroom is to encourage self-development, self-analysis, and a change in human behavior which leads to self-improvement.

Nature of the Problem

In this study an effort has been made to integrate or unify English and world history by using the multiple period arrangement. English and world history are woven into a more or less unified fabric. The two subjects are articulated and relationships between them are made a part of the pattern of classrom instruction. This conception emphasizes interest, meaning, and relationship. English and history are so taught as to reinforce each other. In many areas the topics correlate into broader fields or units such as democracy, international relations, personality, a study of self, religion, and the like.

Activities are cooperatively planned by teacher and pupils. The classes are organized so that they function chiefly through group activities. The role of the teacher in teacher-pupil planning is that of a group leader, assisting the group to reach its goals.

Evaluation becomes an integral part of the unified studies. This evalua-

tion is broad and covers many areas. The pupils evaluate themselves and each other. Also the teacher evaluates through conferences with students. In this way pupils are reminded of their goals and made aware of their progress toward the attainment of their goals.

Design of the Study

This study was conducted during the school years 1949–50, 1950–51, and 1951–52 in three Wisconsin high schools: namely Sheboygan Central, Sheboygan North, and Neenah. The experiment covers 436 students in sixteen tenth-grade sophomore classes in high school. A pilot study was conducted at Central High School, together with a follow-up study. Each pupil in the multiple period class was matched with a pupil who was learning under the regular single period tenth-grade curriculum. The criteria for matching were sex, intelligence, chronological age, reading level, and socio-economic background.

Test Results

A series of achievement tests was administered in the fall and spring, and comparison was made of the results.

On the whole, it may be inferred from the test results that the students enrolled in the multiple period classes do not lose out in fundamental skills when compared with the students in the single period classes. Students in the experimental classes gained more than those in the conventional classs in the objectives measured by standardized tests in English, world history, social usage, critical mindedness, school adjustment, information about the library, and skills measured by the *Social Abilities Test* and reading tests.*

Questionnaire on Pupil's Response to Democratic Classroom Practice

In addition to testing in the experiment, a questionnaire was formulated with the purpose of obtaining as much data as possible concerning classroom practices used in the multiple period. Thirty-five questions were asked of the students to which they could respond: "Almost Always," "Sometimes," or "Hardly Ever." All students in the tenth grade in the three schools were given the questionnaire at the same time and comparison was made between the responses of the experimental and control groups.

From Table I a comparison of the percentage of responses in the experimental and control groups shows that democratic procedures are used more frequently in the multiple period classes. A listing of the highest differences of percentages gives an interesting picture of the practices in the classroom of the multiple period classes compared with the control or conventional classes. Table I may be read as follows: 82 percent of the students in the multiple period classes had much practice in organizing and

* See "The Effectiveness of the Multiple Period Curricular Practices in High School English and Social Studies," to be published in a forthcoming issue of the *Journal of Educational Research.*

TABLE I

STUDENTS' EVALUATION OF PRACTICES ALMOST ALWAYS USED IN EXPERIMENTAL CLASSES AND CONTROL GROUP AT THE CLOSE OF THE YEAR, ARRANGED IN ORDER OF PERCENTAGE DIFFERENCES

(Highest 13 only reported)

Questions	Experimental Classes (218 Students) "Almost Always" Percent	Control Group (218 Students) "Almost Always" Percent
1. Do your classroom procedures give you practice in organizing and serving on committees?	82.4	14.9
2. Do you willingly do the tasks given to you by the student chairman of the project undertaken by the class?	77.4	24.4
3. Do students have something to say about the type of procedure to be used in studying a topic?	65.0	13.0
4. Do your classes follow parliamentary procedure (Roberts Rules of Order) when conducting meetings?	66.6	14.9
5. Do you as a student in your class share in evaluating what you have done?	65.4	20.8
6. Are you encouraged to evaluate the quality of your school citizenship?	66.0	28.0
7. Do students serve as discussion leaders in class?	51.4	16.3
8. Do you assume your share of responsibility for whatever goes on in class?	59.0	28.6
9. Do you have the opportunity to express your opinion in the formulation of projects, problems, or topics in this subject?	79.0	49.0
10. Do opportunities exist in your class for you to lead a meeting?	41.8	12.1
11. Do you show eagerness to participate in student-teacher planning?	46.0	18.0
12. Do you have opportunities to participate in panel discussions, in forums, or in other forms of group discussions?	66.5	39.8
13. Do you have opportunities to share in group solutions of topics, projects, or lesson assignments?	63.1	40.7

serving on committees as compared to 14.9 percent in the conventional classes; 77 percent of the students in the multiple period classes almost always willingly did the tasks or projects given them by their student chairman, as compared to 24 percent in the control classes, etc.

Other classroom procedures listed as frequently practiced by the multiple period classes are:

Sharing in evaluating what is being done in class
Evaluating the quality of the pupils' school citizenship
Serving as discussion leaders in class
Assuming a share of responsibility for whatever goes on in class
Expressing one's opinion on the formulation of projects, problems, or topics
Leading meetings
Student-teacher planning
Participation in panel discussions, forums, and other types of group discussions

Summary and Conclusions

This study was made to obtain as much data as possible concerning classroom practices in the multiple period courses in three Wisconsin high schools. Experimental and control groups were used with students being matched in chronological and mental age, sex, socio-economic status, and reading level.

There seemed to be general uniformity of classroom practices in the three schools in the multiple period classes.

Guidance practices and personal development seemed to be in evidence to a greater degree in the multiple period classes than in the conventional classes.

Students taking the multiple period classes indicated that they had experiences in the broader objectives of education and almost always practiced the following procedures:

Evaluating what is done in class
Organizing and serving on committees
Participating in panel discussions, in forums, or in other forms of group discussions
Practicing parliamentary procedure and conducting meetings using Roberts Rules of Order
Participating in student-teacher planning
Expressing their opinions in the formulation of projects, problems, topics
Sharing in group selection and solution of topics, projects and lesson assignments
Evaluating the quality of their school citizenship
Serving as discussion leaders in class
Leading a meeting

Having something to say about the type of procedure to be used in studying a topic

Discussing personal problems which had a meaning to the individual student concerned

Discussing vocational and educational plans

Conferring with their teachers about their personality traits, attitudes, cooperation, progress, etc.

There were evidences from the pupils' responses that the democratic procedures were practiced to a greater degree in the multiple period classes than in the conventional classes.

A study of this type is reported as a means for awakening more general interest in the improvement of the instructional pattern of the high school, to stimulate gain in professional growth, thus contributing to more functional education for all youth.

CLASS SIZE IS IMPORTANT

School systems that are creating large classes to solve school-building shortages may cause financial problems in the future as well as cause pupils to be poorly taught. These points are emphasized in a report made recently by the Metropolitan School Study Council, New York.

One of the chief advantages of small classes is that they make it easy to locate children with learning difficulties or psychological problems. Helping children with these problems later in their school career is more expensive for the school and community. Another advantage of small classes is that invention and adoption of better teaching practices occur most frequently in these classes.

The report offers this advice to communities for arriving at a class size for their schools:

1. Experiment with different size classes.
2. Consider the personal growth of pupils as well as academic achievement.
3. Remember that there is no magic number for class size; it may vary with subject.
4. Decide on school goals.
5. In forming a policy the range of class sizes is a more important factor to consider than an average size.
6. Community understanding, participation, and acceptance are necessary for a consistent, genuine policy.

—Guidance Newsletter, October 1956

Advantages of the All-Purpose Homemaking Room

By MAURINE VANDER GRIEND

This month the Journal *publishes two brief articles on the all-purpose homemaking room, a facility that is being built increasingly in secondary schools. The first statement is by Maurine Vander Griend who is regional supervisor of the State Bureau of Homemaking Education, working out of Fresno.*

School districts are currently faced with many problems in their efforts to provide the facilities that will adequately meet the needs of the ever-increasing number of students in the public schools of California. In order to meet these needs, adjustments have had to be made in all segments of education. In an effort to make it possible for schools to meet the needs of boys and girls and men and women for instruction in all phases of family living, homemaking departments are being planned to allow for flexibility of arrangement, for maximum use of facilities, and for the adequate space, equipment, and storage necessary for instruction in all the areas of homemaking: foods and nutrition, clothing and textiles, child development, family relationships, housing and home furnishings, home management, and family health. One type of facility used in homemaking departments that has been successful in meeting these needs is referred to as the "all-purpose homemaking room."

The all-purpose homemaking room contains an arrangement within one room of all the equipment and storage facilities needed to carry out instruction in all the areas of homemaking education. The amount of space required for an all-purpose homemaking room and the number of work centers for each area of homemaking is largely determined by class enrollments and the method of teaching to be used.

Among the distinct advantages of an all-purpose homemaking room are the following:

1. Students can work simultaneously at related activities within a unit of instruction. For instance, in a food preparation unit some groups of students in the room may be occupied with meal preparation; others may be concerned with the planning, marketing, and evaluating that are related to the meals prepared; and another group may be occupied in laundering the linens used in the preparation and service of the meal.
2. The all-purpose room is economical because the maximum use can

be made of facilities and space. Through the use of such devices as movable partitions, screens, bookcases, or planters, it is possible to expand or reduce the size of the room as needed for various class activities.

3. Ease of supervision is possible in the all-purpose homemaking room because of the absence of fixed partitions. If an area of the room lends itself advantageously to use as a living-dining center, it can be separated from other sections of the room by a movable partition. This activity, although taking place in a separate area, can be easily supervised, and students can be given an opportunity for experiences in hospitality, home care, or home furnishings at the same time that others are engaged in activities in foods in another part of the all-purpose room.
4. Flexible programs that meet the needs and interests of all students can be carried out in the all-purpose room because facilities for all areas of homemaking are immediately available. Equipment is readily accessible for use by students as they develop an interest in and show readiness for some particular activity.
5. The all-purpose room is adaptable to short units of instruction. This is advantageous at the junior high school level, since instruction at this level is of an exploratory nature.
6. Teachers and students are able to plan for the efficient use of time and equipment in carrying out the study of all areas in homemaking education.

A single all-purpose room is especially suitable for schools with only one homemaking teacher. For schools which have more than one homemaking teacher a satisfactory arrangement of rooms may be a series of all-purpose rooms. The Bureau of Homemaking Education staff is preparing a bulletin to give assistance to teachers using the all-purpose room. It is to include examples of possible class organization with instructional aids for the various areas of homemaking education.

Teachers say these are the leading causes of misbehavior:

- Poor home conditions and lack of parental supervision.
- Lack of training in moral and spiritual values.
- Lack of classes for special groups.
- Overcrowded classes.

An All-Purpose Homemaking Room

By EDITH RAMAKER HARWOOD*

The all-purpose homemaking room deserves this name because all units in the homemaking curricula are taught in the one room. A review of the breadth and scope of the schools' modern family-centered program will contribute to the understanding of the full use of this room, and help to justify the cost. The following nine general subject matter areas represent units based on needs of the different age groups that are taught at each grade level, seventh through twelfth:

1. Child Development and Understanding Needs of Children
2. Clothing Construction, with equal emphasis on Buying and Care of Clothes
3. Nutrition-Physical Health
4. Foods on a Meal Basis, including nutritive values and costs
5. Housing, which covers furnishings as well as choice, use and care of equipment
6. Home Safety
7. Home Care of the Sick
8. Consumer Education in all subject matter areas
9. Family Living, basic to the entire curriculum. Though this is often given special emphasis for a few weeks, it remains an integral part of the entire homemaking program.

Since the teaching of homemaking should be based on the needs of the students, which in turn reflect needs of the home, the points in favor of the all-purpose room outweigh arguments against it.

Seasons create definite needs. Food preservation logically falls in September when fresh foods are plentiful. Winter clothes are either purchased or made, so these units are a logical sequence. The holiday season brings the study of finances, the making of gifts, preparation of festive foods, and the big cry for entertaining at school and in the home. The students in an all-purpose room may study units when the need is present.

Entertainment at school should include families and "dates." Advantage should be taken of every possible opportunity to bring parents, faculties, laymen, and classmates into homemaking departments. Too many adults think of home economics as the "cooking" and "sewing" work they took (or chose *not* to take) when they were in high school. Holiday season is not the only time for entertaining. All year is social time in the homemaking department. Style shows call for teas in all grade levels. Parties for children are delightful and can be given at any time in an all-purpose room. New equipment displays, new textiles, and all of the many new

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methods should be shared with those outside of the department. Often parents serve as panels with the young people and together consider problems that families face. Simple refreshments do much to "homogenize" the group and encourage participation. The availability of kitchens during the entire year and to all classes is one of the biggest assets of the all-purpose room.

Child care, with play schools, has a natural setting in the all-purpose room. The unit kitchens during the play schools are set up as stores, a reading room, a small play house, a game room, and a toy space. Food for children is prepared right there. Laundry and care of clothes, often taught in the clothing-type laboratory, is more easily taught in an all-purpose room. It is equipped with a laundry, drying space, and ample hot water. Sewing machines, stoves, and utensils are needed in the housing units. Care of the sick needs both sewing machines and the foods units if improvised equipment is to be made and food for the sick prepared. The all-purpose room enhances all areas of a family-centered curriculum and makes the teaching of homemaking more effective.

Homemaking teachers for many years have been taught a broad philosophy of the curriculum and have studied all aspects of the subject matter enumerated above. In fact, a credential in homemaking is given only if requirements are fulfilled in all of these fields. Such teachers are thwarted from the beginning if they must become either clothing or foods specialists. "Specialists" may teach money management in the foods units and the buying of clothes in the clothing laboratory, but the effectiveness is lost if the whole picture of family finance is not presented. A teacher who stays with her class the entire year knows she is considering the many facets of homemaking and is meeting the needs of the many income levels—and frequently the many races—represented in her classes. The fact that a teacher can keep her classes throughout the year and teach the entire homemaking curriculum is a powerful argument for an all-purpose room.

The idea has been advanced by some that the teacher in these rooms can teach two groups studying different units at the same time. For example, half of the class could be preparing food and the other half studying home furnishings. This plan has several serious drawbacks. There is always the danger of "surface" teaching where no learning really takes place, no change is made in the attitude of pupils, and nothing new is learned. Aggressive, often bossy, students control small groups and they decide what is to be studied while the timid tag along. The best of teachers has all she can do to recognize the differences in family backgrounds, to respect these differences, and to teach so that the needs and problems of all students are met, without having to divide her interest between two simultaneous units.

The outlay and arrangement of an all-purpose room may be illustrated by the San Diego plan which each year shows improvements. Seven or

eight unit kitchens are placed in a U-arrangement. Usually there are four units on one side and three units with the laundry on the opposite side. The end wall has cupboards, closets, built-in teacher files, blackboard and bulletin board space. Only refrigerators with built-in freezing units are purchased. This gives ample space for foods usually stored in the frozen food unit and eliminates the need for a deep freeze. There is only one garbage disposal. We recommend at least two. The laundry has a washer, dryer, storage space for towels and detergents.

The other half of the room contains a fitting room, wardrobe cabinets, another blackboard, storage space and "hangars" for the sewing machines when not in use. The fitting room, 5′ × 5′, does not look like the old box-type fitting room. A wardrobe and a 5′ bookcase form the partitions. There is no regular door. Attractive bamboo screens are used to hide the opening. Four to six sewing machines are stored in the "hangars." The San Diego senior high schools use portables with much success. These are the machines mostly used at home. The tables are regulation 42″ × 36″, with square corners and formica, or comparable, tops. So that textiles and stockings cannot be snagged, tables and chairs have chrome legs. We have no tote-drawers, only space for sewing equipment. Wardrobe space is increased, as garments should be hung as soon as possible and not crammed in boxes or tote-drawers. Some of the space in the unit kitchens has been converted to all-purpose drawer-space.

The groups or families of four in each class retain one kitchen all year. Often six classes meet, one each period, so we have six drawers in each unit kitchen, each with its own lock. The first period class has drawer *one* in each unit; second period drawer *two* and so on. The four students use this for their aprons, if preparing food, for their sewing or child care equipment or for storage of other materials. A portable demonstration table with large mirror is a must. Demonstrations of all kinds, clothing construction techniques, laundry, bathing a baby, food preparation, and many others are given on this most usable piece of equipment.

What is the cost of the all-purpose room? It costs less in a one-teacher department than separate clothing and foods laboratories. Two all-purpose rooms, however, cost more than a foods and a clothing laboratory. Is it not time for administrators, teachers, and parents to place emphasis on the homemaking curriculum where it is needed and have the equipment and space to teach young America the art of living together in a happy environment?

We all need help in knowing how to buy our clothes. Finances and budgets are important to everyone. How to understand children and help them to become healthy adults deserves much consideration. The do-it-yourself trend is on the increase. Nutrition and physical health information is needed by everyone. The all-purpose room is designed for a program based on needs such as these. It will meet the requirements of homemaking for many years in the future. We should build today for the future.

Current Events and Materials in Music Education

By CHESTER W. MASON*

The biennial meeting of the Western division of the Music Educators' National Conference will be held this year in Pasadena from April 14 to 17. The theme of the meeting will be concerned with basic concepts in music education. On Monday, April 15, most of the day will be devoted to a general meeting titled "Basic Concepts—the Balanced Program." During this session a number of groups will demonstrate how music theory, music literature, correlation to other subjects, and other learnings can be achieved in secondary schools in the course of preparing music for performance. The entire conference will be geared to helping those in music education broaden the program in the secondary schools to include musical understandings as well as performance skill as the primary goal.

The conference will be hosted by the Pasadena City Schools with the superintendent, Stuart McComb, acting as general chairman. Leland Green, coordinator of music in the Pasadena schools, will be the host.

All-conference high school groups are being organized for the Pasadena meeting. Harold Decker, Wichita University, Wichita, Kansas, will direct the chorus. Fred Fennell, Eastman School of Music, Rochester, New York, will direct the band; David Robertson, Oberlin College, Oberlin, Ohio, will direct the orchestra.

Over-all planning is under the general direction of Dr. Alex Zimmerman, director of music in San Diego and president of the Western division of the M.E.N.C.

Kimber Music Awards

The annual Kimber Award for outstanding young musicians will function this year under slightly changed policies. This year there will be two prizes of $2,000 each. One will be awarded to a pianist and one to a violinist or 'cellist. In both cases the award is to be used for further study.

There will be two preliminary auditions from which three representatives will be selected for the semifinal with at least one pianist and one string player in the group. Preliminary auditions will also be organized by the Federated Music Clubs. The six semifinalists in the Northern auditions will compete in semifinals in the North. One pianist and one string player from this will be chosen to compete against the finalist from the South. No contestant will be allowed to enter both the C.M.E.A. and Federation preliminaries.

The Charles M. Dennis Vocal Award and the Frank Mancini Award will be continued under the same regulations as previously.

* Supervisor, Music Education, San Jose City Schools, and Consultant Editor for the *Journal*.

Northern California State Music Festival

The Northern District 1957 State Music Festival will take place on four dates and in four different locations this year. On Friday, May 10, the senior high school and junior college instrumental festival will be held at San Francisco State College in San Francisco; on Saturday, May 11, the elementary and junior high school vocal festival will be held in Oakland sponsored by the Oakland Public Schools; on Friday, May 17, San Jose State College in San Jose will host the senior high and junior college vocal festival; on Saturday, May 18, this series of festivals concludes with the elementary and junior high instrumental groups performing in the Richmond Public Schools.

All entry fees remain the same as last year—$5.00 from each participating school, 25¢ from each student, $1.00 from each ensemble, soloist, or baton twirler. Further information and entry blanks may be obtained from the Festival President, Bryant F. Figeroid, San Leandro Unified School District, 541 W. Joaquin Avenue, San Leandro, Calif.

Keaton Music Typewriter

The Keaton Music Typewriter looks like an instrument that can be used to good advantage, especially for anyone preparing to duplicate numerous copies from a master copy. The music so printed is extremely legible and well spaced. This music typewriter comes from 461 Market Street in San Francisco.

New Educational Records

The Grand Award Record Corporation is now issuing a new series of instrumental recordings. *Leonard Smith Plays the Cornet, Robert McGinnis Plays the Clarinet,* and *Sigurd Rascher Plays the Saxophone* are three fine instrumentalists on these 12-inch long-playing recordings produced to inspire young artists to higher levels of musical achievement.

The fourth edition of *Musical Acoustics* by Charles A. Culver and published by McGraw-Hill will be of interest to many music teachers concerned with their rehearsal or concert room. After discussing the scientific principles that are the foundation of the art of music, the latest findings of research workers in the field of acoustics are presented.

The Private Lives of the Great Composers, Conductors, and Musical Artists of the World by Bernard Grun, published by Library Publishers of New York, brings numerous anecdotes and stories about many famous figures in the history of music. It is a most interesting and entertaining book.

Music Makers by Pitts and others is Ginn and Company's new vocal program for general music classes in high school. Designed specifically for the general student body, it contains many songs in unison or simple harmonies for class sings and assembly programs as well as public performances. Band and orchestra accompaniments for three of the selections are available on loan and a record album is available including twenty-four of the selections.

What's Happening in California Secondary Schools

By WILLIAM N. McGOWAN*

California secondary schools have made great progress in recent years with the development of orientation programs for new teachers in a district. The following material is presented in the hope that it will help in the evaluation and improvement of these programs. It has been developed by George L. Roehr, Consultant in Secondary Education, State Department of Education, who can supply additional copies of the form for duplication. For further information write Mr. Roehr, State Department of Education, 721 Capitol Avenue, Sacramento 14, Calif.

APPRAISAL FORM FOR PLANNED PROGRAM FOR ORIENTATION FOR NEW TEACHERS

Introduction

It is the purpose of this appraisal form to record the opinions of "new" teachers who have been oriented to first or new jobs by participation in a program planned for this purpose. These new teachers may be beginning teachers or experienced teachers newly employed in a school system.

The combined opinions obtained will not only indicate how successful the program has been but, more important, these opinions will indicate where improvement in the program is most needed. Your most careful judgment will be of great value.

Nature of the Appraisal Form

The body of the appraisal form consists of thirty-three statements phrased in problem form. The problems are those which must be resolved to some degree by each new teacher. The problems are drawn from research that has enabled new teachers to report the most significant problems confronting them as they adjusted to a new or first teaching position.

Three types of reaction are sought concerning each of the thirty-three problem statements. The first is your opinion concerning the relative importance to you of the problem indicated by the statement. The second is your estimate of how well your new school system has provided resources, information, and the basis for you to understand matters pertaining to

* Executive Secretary, California Association of Secondary School Administrators.

the solution of each problem. The third reaction concerns the timeliness with which the orientation activities have been accomplished.

The second and third types of reaction are closely related. Both must be satisfactorily accomplished if the orientation is to be effective.

Directions for Recording Your Appraisal

You are to record each type of reaction numerically. The number "5" will represent the most favorable reaction, while "1" will be used for the least favorable reaction and "2," "3," and "4" will be used for gradations between.

There are three blanks preceding the number of each problem statement. Taken vertically these form Columns "A," "B," and "C." Fill Column A before proceeding to B. In like manner complete Column B before Column C.

Entries for *Column A*: The numbers to be entered on the blanks of Column A are to indicate the differences in importance to you of each of the thirty-three problems. Problems are important for various reasons. Some are crucial, some are encountered with great frequency and some have a profound influence upon the prime goals of the teacher and the school.

The following statement relates the numbers of the rating scale to verbal phrases that differentiate the importance of problems. It is provided as a guide to your entries.

Column A Entries: Rating the Importance of Problem Areas

—5— Very important—failure to solve results in many or traumatic interferences with the operation of the school. An effective school is dependent upon a satisfactory approach to the solution of this problem.

—4— Fairly important—continued failure to solve or partially solve is intolerable.

—3— Moderately important—not important to the point of compelling adjustment unless combined with other unsolved problems of similar importance.

—2— Less important—failure to solve produces irritation rather than malfunction.

—1— Least important—if this problem were the sole one to go unsolved, the problem might go unnoticed.

When you have completed Column A continue with Column B.

Entries for *Column B*: The numbers entered in Column B are to indicate the degree to which the orientation program has provided you the resources, information, and understandings needed to meet the problems in areas identified by the problem statements. The following verbalizes the numerical ratings and is offered to aid you in differentiating your entries.

Column B. Entries: Rating the Quality of Knowledge Provided

—5— The knowledge provided exceeded your expectations—covered matters that you had not recognized a need for.

—4— The knowledge provided filled all of the needs which you have recognized.

—3— All major needs fulfilled but some questions left unanswered.

—2— Some major needs were not met, considerable vagueness remained.

—1— Information was not provided at all or that provided was of little value.

When Column B is completed proceed to Column C.

Entries for *Column C*: In an orientation program it is assumed that certain understandings are to be developed prior to occasions when action will be influenced by these understandings. Again, the following verbalizes the numerical ratings and is offered to aid you in differentiating your rating of timeliness.

Column C Entries: Rating Timeliness

—5— Understandings were developed at such times preceding need so they were sufficiently recent and available as to be most readily applied. The skill with which this was done exceeded your recognized requirements.

—4— All understandings were provided prior to the time you needed them and were sufficiently fresh as to be used well.

—3— The time lapse between the orientation activity and its use was too great in several cases. Some details were supplied after the need for them had passed.

—2— Some major knowledge was supplied after the need for it had arrived or passed. Of those understandings provided prior to the time of need many were not spaced well with respect to the time of use.

—1— Little thought was evident in relating the time of providing knowledge to the time when that knowledge would be useful.

Your Comments

Following the thirty-three problem statements space is provided for you to add comments. If any of your comments are related closely to any of the problem statements, please refer to the problem statements by number. Comments related to matters not covered by the problem statements are particularly important.

You are now ready to begin with Column A.

THIRTY-THREE ORIENTATION PROBLEMS

UNDERSTANDING OF IDEAS AND CONCEPTS

Columns

A B C

— — — 1. School Philosophy: To understand the values held and goals sought in order to be able to act in the light of such understanding.

— — — 2. Community Cultural Climate: To understand the values held by subgroups that constitute the community in order to interpret community reaction.

— — — 3. Community Problems and Tensions: To understand problems that influence the behavior of adults and children in the community.

FUNCTIONAL COMMAND OF SCHOOL FACILITIES

A B C

— — — 4. Buildings and Grounds: To know the campus geographically sufficiently well to establish personal self-confidence, to assist students, and to understand references made by them.

— — — 5. Use of Facilities: To know how to manage the mechanical details of your classroom and the other portions of the building as these details relate to the safety, instruction, and comfort of your pupils.

— — — 6. Instructional Materials: To know how to secure the instructional materials that may aid directly your program of instruction, such as books, pictures, maps, charts, projection equipment, etc.

— — — 7. Decorative Resources: To know the permissible activities and the sources of materials that may be used to increase the attractiveness of your teaching location.

— — — 8. Unsatisfactory Facilities: To know about unsatisfactory facilities, why they exist, the status of plans for improvement, and suggestions for effective current use.

ADMINISTRATIVE RELATIONSHIPS AND PROCEDURES

A B C

— — — 9. Job Description: To know the scope of your position prior to accepting the position.

— — — 10. Classroom Phase of Job: To be informed about the teaching to be done, soon enough and in sufficient detail, in order to accomplish voluntary preparatory activities.

— — — 11. Non-Classroom Responsibilities: To be informed about the demands the non-classroom aspects of your job will make upon your time and energy.

— — — 12. Record Keeping: To understand the routines concerning each type of record required in order to insure accurate, prompt usage, and to avoid anxiety.

— — — 13. Responsibility for Pupil Behavior: To have a clear understanding of the line and extent of responsibility in matters of pupil behavior, both in and out of the classroom.

— — — 14. Teacher-Class Load: To know the policy with respect to teacher-class load and the current status of the teacher-class load in your school.

— — — 15. Reaction to Supervision: To know how to respond to supervision including that which you feel to be non-constructive.

— — — 16. Advisory Resources—Room Decoration: To know sources of reliable counsel with respect to your activities in decorating your classroom.

— — — 17. Advisory Resources—The Community: To know sources of reliable counsel with respect to the community as its various aspects, such as museums, etc., may benefit effective teaching.

— — — 18. General Counsel: To be aware of staff members with whom you might take counsel with respect to problems, needs, or frustrations so that reasonable action of a helpful nature might be initiated.

— — — 19. Conference with Principal: To have a conference with your principal after your job assignment was reasonably clear and before any major operational problems have arisen.

CLASSROOM AND INSTRUCTIONAL MATTERS

A B C

— — — 20. Pupil-Teacher Load: To be prepared for your teacher-pupil load by a knowledge of the school's policy and current practice with respect to it.

— — — 21. Grading—Evaluation: To understand the school's policies and practices with respect to the evaluation of pupil achievement.

— — — 22. Pupil Rapport: To become acquainted with at least some of your prospective pupils prior to the opening of school.

— — — 23. Rapport with Parents: To become acquainted with parents of pupils prior to the existence of any condition of stress.

— — — 24. Community Resources: To become familiar with community resources that could be related to your teaching activities.

— — — 25. Class Organization: To be informed concerning the patterns of initial class organization that the pupils might expect as a result of prior experience.

— — — 26. Teacher-to-Teacher Relationships: To inventory and indicate individual and mutual action desired relative to such matters as joint use of rooms and other facilities, or classroom and playground activities potentially bothersome to other classes.

PERSONAL MATTERS

A B C

— — — 27. Living Quarters: To survey and select the most desirable living quarters.

— — — 28. Reaction: To survey and initiate participation in satisfactory recreational activities.

— — — 29. Participation in Community Life: To be informed about social, economic, and political groups and activities in order to appraise their interest and worth for you.

— — — 30. Salary and Personal Finances: To be informed about pay periods, amount of withholdings, and other matters related to the management of personal finances including resources for advice.

— — — 31. Personal Welfare: To know the community's resources for material service, religious life, family counseling and other resources beneficial to physical health.

— — — 32. Professional Contacts: To develop social and professional contacts with other teachers.

— — — 33. Personal Counsel: To know of staff members capable and willing to give counsel about matters not directly related to school activities, but which have a bearing upon the effectiveness of you as a teacher.

COMMENTS

(Reference may be made to any problem statement by number.)

Symposium

SECONDARY SCHOOLS FACE THE CRISIS IN SCIENCE MANPOWER

This month the *Journal* turns the attention of its symposium to the critical problem of the growing shortage of scientific and technical manpower in the United States.

The text for this symposium may be found in the recent address of Monroe E. Spaght, Executive Vice-President, Shell Oil Company, entitled *The High School—Birthplace of Scientists* in which he stated:

> "On the basis of . . . research—and my own observation—I am convinced that the high school is the birthplace of the world's scientists, and that the high school teachers are in charge of it. It is the high school teacher that can kindle the interest that awakens our scientists of the future."

Contributing to the symposium are two national leaders, two California teachers, and a California science educator. We thank each of them for their contribution, especially Dr. Paul DeH. Hurd, Associate Professor of Education, Stanford University, who has coordinated the symposium.

Problems Confronting Secondary School Science Education

By PAUL DeH. HURD*

The most characteristic feature of society today is found in the methods and achievements of science. Within the last ten years the number of break-throughs in science has brought about a different world, a society in which discoveries in basic science and engineering skills mean economic and political power. Few people imagined fifteen years ago that this new technological age would arrive so soon.

The rapid progress in science has brought about an immediate problem of scientific and technical manpower shortage. Each new discovery pushes the frontiers of science further ahead, and there are no foreseeable limits. With every advance the demand for mathematicians, scientists, and engineers is increased. Developments in automation, nuclear energy, electronics, and chemotherapy, for example, open new horizons stimulating in

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turn more research which requires more researchers with a higher level of training and competence.

In 1940, $900,000,000 was spent on all types of research in the United States; by 1955 this amount had grown to $5,000,000,000. In 1900, one person in every 300 of the labor force was a scientist or engineer; today the ratio is 1 in 80, and the number must double every ten years to maintain scientific progress in America.

In 1940, there were approximately 250,000 engineers in the United States; in 1956 the number was 600,000. The number of scientists and mathematicians in 1940 was 92,000 and in 1956 the number has grown to 250,000. Yet nearly every major industry reports a serious hampering in research and development due to a shortage of scientific personnel. The manpower problem is more than just catching up on the supply. Recently, Admiral Hyman G. Rickover of the U.S. Atomic Energy Commission in summarizing the situation stated "that to maintain our relative position in the world economy and to preserve our high standard of living, American industry must—ten years from now—produce forty percent more than it does today." The number of scientists and engineers graduating annually from American colleges and universities supplies only 50 percent of the present yearly requirement.

Further analysis of the technical manpower situation can only reveal that the shortage is serious, that it will undoubtedly get worse, and that monumental efforts in many directions are needed to improve the condition. It is also apparent that America is in the midst of an industrial revolution—a new technological age—which is placing unprecedented demands upon the educational and research resources of the country.

There is great concern on the part of both scientists and social scientists regarding the growing impact of science upon social forces. Modern society has become increasingly dependent upon science and is in turn characterized by the achievements of science within this society. The accelerated growth of science and technology has come about as a response to strong social demands. While science has grown, new social issues and problems have been generated. Neither sufficient recognition of nor adequate solutions to these problems have been forthcoming which are commensurate with the seriousness of the situation. The situation has major implications for educational policy at both the high school and college level.

In times of crises in America a first reaction is to re-examine the schools—"to find out what's wrong with education." Presently, attention is focused most sharply on science and mathematics teaching. Almost every one has expressed a need for some kind of action though few have suggested the nature of this action and even fewer have attempted critically to examine the problem.

A review of secondary school science education for the past fifty years reveals some noteworthy results. The high schools of America have helped to train the 600,000 engineers, the 250,000 scientists and mathematicians, and nearly a million others in which science is a part of their education,

such as doctors, psychologists, agriculturists, science and mathematics teachers. This number does not include an unknown number of skilled technical workers. These results have been achieved under conditions of economic depression and wars, with inadequate class and laboratory rooms, with sparse and out-dated equipment, by teachers whose salaries were typically inadequate to launch their own children upon scientific careers. These are the results of science teachers who average forty-eight hours per week in teaching and preparation, one-half of whom are required to teach three or more different sciences every year and must do so in nearly 40 percent of the cases without a permanently assigned classroom. Under these conditions the science teachers of America provided the initial stimulus that has led to our present supply of scientific personnel.

Some critics have suggested that in spite of these results, the science teachers should have done the job differently and better, their education and adequacy of special training are brought into question. Seldom is it mentioned that suitable programs for the advanced training of science teachers have not been available in colleges and universities. Professor Eugene P. Northrop commented recently on the point as follows:

> "Also to come under review would be an assumption that is well established but hardly self-evident. I refer to the assumption that the best training for a technician in a given scientific field, or for a college or high school teacher, is no more and no less than the training designed for researchers in the field, lopped off at some point."[1]

There are now about eight times as many students enrolled in chemistry courses in high school as there were in 1900, and nearly twice as many taking physics. The percent of the total number of students taking these courses, however, has declined consistently since the beginning of the century. Nearly three-fourths of secondary school graduates have *not* had courses in the physical sciences. If these figures are compared with the accelerated demands for scientists and engineers, the critical nature of our present situation becomes apparent. The problem is now one of how to increase the fraction of students who will choose careers in science, mathematics, and engineering.

To motivate young people into science careers requires teachers who know and understand science. Since 1950 the number of science and mathematics teachers credentialed throughout the United States has dropped over 50 percent. The National Educational Association estimates that at least 7700 science teachers are required per year to meet ordinary demands; less than one-third of this number are being trained. Of the students graduating from college with a major in physics and who have also completed all credential requirements, less than one-half will be found in teaching positions the following year. The supply of qualified physics teachers for the

[1] *The Growing Shortage of Scientists and Engineers*, Proceedings of the Sixth Thomas Alva Edison Foundation Institute, New York University Press, 1956, p. 36.

29,000 high schools of the country does not exceed 125 per year. Professor Fred Dutton, in a recent editorial in the *Journal of Chemical Education*, pointed out that "in the last year only a few chemistry teachers and no physics teachers were certified by the State of Michigan and there is no reason to believe that the national picture is much brighter."[2] Procedures must be found to increase the number of competent science teachers if there is to be the kind of teaching needed to excite young people about careers in science and to provide them with basic science education.

The high school curriculum in science is in serious need of re-evaluation. Some of the questions which must be answered are: Do course objectives reflect the changed nature of our presently science-oriented society? Is the content of existing courses in line with the latest developments and discoveries in science? More and more one finds the term "classical" applied to the content of courses in physics and chemistry. Textbooks contain an overwhelming amount of material that can be described as having only historical significance; there is very little of the "recent" in science. It seems futile to continue to patch, revise, and re-organize the existing science curriculum—the time has arrived for a complete overhaul.

These are some of the problems confronting secondary school science teaching. Solutions to many of these problems will not be easy. Within the papers which comprise the major portion of this symposium will be found descriptions of programs and suggested procedures for resolving some of the more critical aspects of science teaching. Seldom in American history have there been so many positive efforts so vigorously pursued to improve a special area of the high school curriculum.

[2] *Journal of Chemical Education*, January 1957, p. 1.

The National Science Foundation Program for High School Science Teachers

By ALAN T. WATERMAN*

The current interest in the scientific manpower situation has focused a good deal of attention on the high school science teacher. To those of us who have been thinking about long-range aspects of supply and demand with respect to scientists and engineers, it is quite apparent that the teaching of science in secondary schools is of crucial importance in the whole situation.

It is likely to be in the secondary schools that the student is either attracted to a career in science or discouraged from any further interest in it. The same thing is true with respect to mathematics. Far too little credit has been given those overworked science teachers in the high schools who, with limited equipment and out-of-date textbooks in some cases, nevertheless succeed in giving their students adequate groundwork for later work in science, mathematics, and engineering. It is equally true that until recently little has been done about the less fortunate situations in which poorly trained teachers are struggling to teach technical subjects of which they have wholly inadequate knowledge.

The National Science Foundation is an agency of the federal government, established by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." Its major activities are the support of basic research and the award of fellowships in the mathematical, physical, medical, biological, engineering, and other sciences. It became apparent within the Foundation at an early date that the teaching of science and mathematics in the secondary schools would have to be improved if other measures being undertaken at the undergraduate and graduate levels were to be fully effective.

The Foundation has therefore undertaken a series of experimental programs, which it is hoped will contribute to better science teaching in the secondary schools and point the way toward self-sustaining programs, as well as stimulate interest and assistance from industrial organizations and other private groups.

Foundation programs directed toward assistance at the secondary-school level fall into three broad categories: (1) teacher training; (2) student participation programs designed to arouse interest on the part of students in the opportunities open in careers in science and engineering; and (3) curricular studies.

* Director, National Science Foundation.

Teacher-Training Programs

The institutes for high school and college teachers of science comprise the largest of the Foundation programs devoted directly to the training of teachers. These are of two kinds: academic-year institutes for high school teachers of science and mathematics; and summer institutes for both college and high school teachers. Grants have been awarded for the support of sixteen academic-year institutes for 1957–58. The grants provide for a stipend of $3,000 per teacher, plus additional allowance for dependents ($300 each, up to a maximum of four dependents), and travel (two round trips between home and institute, at the rate of 4¢ per mile, with a maximum of $80 each trip). Tuition and other fees will also be covered, as well as an allowance for books. This program provides financial assistance to about fifty teachers at each institute, for a total of 750 teachers.

The special courses of study in science and mathematics have been planned cooperatively by members of the science, mathematics, and education departments in the host institution. These courses will be accepted as partial fulfillment of the requirements for a master's degree.

Ninety-five grants have been made for summer institutes, which will provide opportunity for study of science teaching to approximately 4,500 high school teachers and 250 college teachers. Most institutes will pay stipends directly to participating teachers at the rate of $75 per week, plus $15 per week for each dependent, to a maximum of four. Each participant will receive a travel allowance equal to a single round trip between his home and the institute, at the rate of 4¢ per mile, to a maximum of $80. The Foundation grant to the institute will cover tuition and fees.

A list of the institutes for science and mathematics teachers containing the names of the persons to whom application should be addressed may be obtained upon request addressed to the National Science Foundation, Division of Scientific Personnel and Education.

Student Participation Program

The Foundation is cooperating in, or offering partial support to, a variety of programs designed to stimulate student interest in the career possibilities of science and engineering.

The visiting scientist program is one of the most promising of these efforts. It was pioneered by the Mathematical Association of America, which sponsored a series of lectures by distinguished mathematicians who visited a number of small colleges and high schools during the academic year 1954–55. The visiting lecturers remained for several days, attending classes, conducting seminars, teaching classes, and consulting with students and faculty. The unqualified success of this first program attracted the interest of other professional societies, and the Foundation is now supporting similar visiting-lecturer series in biological science and chemistry, as well as in mathematics.

The Foundation has for several years awarded grants to Science Serv-

ice, Inc in partial support of its Science Clubs. About 300,000 high school boys and girls belong to these clubs; and the Science Fairs, in which they exhibit original projects, have attracted nationwide interest.

Teachers and counselors have stressed the value of imaginatively conceived and attractively presented literature on career opportunities in science. Although some literature of this type is already available, not all fields are represented. The Foundation is giving support to qualified professional organizations which are undertaking to fill the gaps. The Foundation supported the purchase and distribution of 25,000 copies of the attractive brochure, "Career Opportunities in Biology," by Russell B. Stevens, published by the National Academy of Sciences—National Research Council. Copies were sent to each of the nation's 23,000 secondary schools and junior colleges.

Curricular Programs

The acute shortage of trained science teachers in the secondary schools and colleges has made it necessary to extend and supplement the effectiveness of available science teachers in every feasible way. We have, therefore, undertaken to scrutinize and evaluate a variety of teaching aids, including textbooks and laboratory manuals, equipment for experimental demonstrations, motion-picture films, and the use of television in both closed and open circuits.

Of primary importance, of course, is the curriculum itself. It seems clear that neither curricula nor textbooks have kept pace with the rapid progress of modern science; and even at best, teachers are handicapped by having to work with outdated material. The Foundation recently awarded a grant to the Massachusetts Institute of Technology to support a two-year study of physical science teaching in secondary schools. A special committee, under the chairmanship of Jerrold R. Zacharias, professor of physics at MIT, will examine all possible means of improving instruction in the physical sciences, including the preparation of new textbooks, new laboratory manuals, new experimental equipment, new teaching techniques, and extensive use of films. The committee will have the advice and assistance of leading members of the faculties of California Institute of Technology, the University of Illinois, and Cornell University, and of representatives of the Bell Telephone Laboratories. Dr. James R. Killian, Jr., president of MIT, will be chairman of the larger group, composed of scientists, high school administrators and teachers, representatives of state departments of education, and others, to advise and make recommendations on problems of acceptance and disposition.

The caliber of the men who have consented to participate actively in this project or to serve as consultants, coupled with the fact that adequate funds have been made available, should insure thoroughgoing attention to a problem that has long required attention. It is hoped that this large-scale effort in the physical sciences may stimulate interest in, and attention to, similar problems in other fields. The Foundation has been encouraged by

the receipt of proposals for the support of the preparation of up-to-date source books and mathematical materials for the use of secondary school teachers.

Another effort which promises to be highly successful is the traveling science demonstration program, undertaken by the National Science Foundation in cooperation with the Atomic Energy Commission. A group of selected high school teachers was given three months' training in Oak Ridge, including the four-week Oak Ridge Summer Institute for Secondary School Science Teachers. These teachers are spending the 1956–57 academic year traveling and giving lecture-demonstrations in science classes on such topics as: Atomic Structure, Solar Energy, Nuclear Reactors, Wave Motion, Mechanics, and many others. One-week visits are being made at approximately 200 high schools. Requests for this service have been received from more than 1300 schools in all forty-eight states.

The *Supplemental Traveling Science Library* was undertaken by the Foundation as a joint project with the American Association for the Advancement of Science. During the first year of the program, twenty-five libraries of 150 carefully selected books on science were circulated among sixty-six small high schools. This year, twenty-five sets of 200 books each are being circulated among 100 high schools.

The use of films and combinations of film and television offer another promising means of extending the effectiveness of science teachers. Although films were used successfully for training purposes in World War II, and again in more recent experiments, there are few topical films specifically designed for instruction purposes in science courses in high schools. It is important that films about science be prepared to acquaint parents with the ideas and activities of scientists; backgrounds of teachers are also enriched by such films. The Mathematical Association of America has indicated an interest in the possibilities of films and is planning the preparation of a series of instructional films designed to bring to students topics that are not normally in texts; to present famous mathematicians to students; to show mathematics as a continuously developing subject; and to show some of the fascination of the subject.

The potentialities of television for instructional purposes are very great and as yet have scarcely been explored. The Foundation is planning to support studies of television as a means of science instruction and to underwrite pilot operations in the preparation of television programs for instructional purposes. High production costs have thus far deterred private enterprise from venturing into this field.

The various items described in the foregoing paragraphs cover the Foundation's principal activities with respect to teaching of science in the secondary schools. Most of them are new; most of them are highly experimental; but it is hoped that they may be helpful, not only intrinsically but also as a means of calling public attention to an area of need.

Before closing, I should like to say one word about the conferences and workshops, which bring together interested persons for a discussion

of mutual problems. The expressions of enthusiastic appreciation for these gatherings lead us to believe that the support of such conferences by the Foundation is a most useful activity. During 1956, the Foundation sponsored some seven conferences, which included the conference on the identification of creative scientific talent; the conference of summer institute directors; a conference of executive officers and educational committee chairmen of professional scientific societies designed to encourage the selection of technical careers and improve the training of talented students; and a conference on teacher education in the sciences, sponsored jointly with the American Association for the Advancement of Science and the U.S. Office of Education. Fifteen conferences of this type are planned for 1957. All conferences are regional in character so that many teachers can attend who cannot afford to travel to national meetings.

Because all these programs are new and essentially experimental in nature, we are devoting considerable thought and effort to evaluation studies. A few such studies have already been made; others are in progress and planned for the future. Evaluations include interviews with teachers who have participated and reports of the program directors. Staff members of the Foundation visit the projects as frequently as possible and contribute their own reactions to the over-all evaluation.

This program of the Foundation, devoted to the study of constructive means of improving science teaching and to an increased understanding of science on the part of students, is a public program being carried on by a public agency in the national interest. We should welcome the spontaneous comments and reactions of teachers, scientists, educators, and all others who come into contact with it throughout the country.

READING TRENDS

The "Why Johnny Can't Read" hassle of a few years ago has sobered to precision ways and means of increasing the quantity and quality of reading in the student's life. John J. De Boer, *Elementary English* editor and Professor of Education at the University of Illinois, said that the most significant advance in the teaching of reading at the high school level in the last twenty-five years has been the enormous emphasis on extensive reading. Intensive drill or minute examination of literary passages, the predominant approach of a generation ago, has been balanced by free, extensive reading.

—*Scholastic Teacher*, December 13, 1956

How the United States Office of Education Plans to Assist in Meeting the Crisis in Science Teaching

By ELLSWORTH S. OBOURN*

The crisis in science teaching is a topic brought frequently to our attention these days through newspaper and magazine articles and through the efforts of many organizations. Millions of dollars are being spent annually by the federal government and by many non-governmental organizations, to improve the teaching of science in the schools of the nation.

The public view of this crisis quite often takes the form of relating it to a shortage of trained scientific and technological personnel or to a limited supply of science teachers. There can be little doubt but that each of these is critical and further that the teaching of science in the schools is involved in alleviating either shortage.

However, it should be kept in mind that coping with the crisis in science teaching involves far more than just increasing the *numbers* of trained scientists or science teachers. It is basically a problem of the culture of our times. The atom and the hydrogen bomb together with the projected peacetime uses of atomic energy, coupled with the applications of science in business, industry, agriculture, health, and medicine have suddenly stirred the nation's people from a prolonged lethargy regarding the importance of science in the education of people.

People are becoming aware that we are living in a new age. The realization is spreading that science is important in the lives of people and that the next generation will live in a world dominated by science which they must understand, and direct intelligently.

Steps must be taken to alleviate the shortage and improve the education of scientists, engineers, and teachers, but equally as fundamental, is the staggering task of developing and maintaining education for this modern age which must not be neglected.

The proposals of the United States Office of Education in meeting the current crisis in science teaching must be viewed in the light of the two basic aspects of the problem which have been delineated. Within the limitations of the basic purpose and the general program of the Office of Education, the efforts of those concerned with science education must be directed toward those services which will provide factual information, leadership, and help toward increasing the numbers of young people who will go into the scientific professions. At the same time, there must be a strength-

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ening and broadening of the science offerings for all pupils in the elementary and secondary schools of the country while keeping these offerings in balance with the other areas of the curriculum.

The basic purpose of the United States Office of Education was defined by the enabling Act of Congress through which it was established in 1867. This Act stated:

> "Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established, at the city of Washington, a department of education, for the purpose of collecting such statistics and facts as shall show the condition and progress of education in the several States and Territories, and of diffusing such information respecting the organization and management of schools and school systems, and methods of teaching, as shall aid the people of the United States in the establishment and maintenance of efficient school systems, and otherwise promote the cause of education throughout the country . . ."[1]

The current problems in science teaching are not new to the staff at the United States Office of Education. It is a tribute to those professional staff members who preceded the writer, that in the late 1940's they anticipated the present crisis and took steps at that time to get action on some basic needs related to emerging problems. A brief review of these efforts will give some perspective to the current program, to be discussed later in this article.

As early as 1947, the Commissioner of Education made provision for securing the services of two science specialists from the field of Elementary Education, two from Secondary Education and one from Higher Education. This group formed the nucleus of an interdivisional committee within the Office which considered the growing problems of science teaching and developed program plans to deal with them.

About the same time, the Commissioner of Education established an Advisory Committee to the Office staff on science teaching. This group was made up of some of the national leaders in science education. It met several times each year to develop plans for the Office of Education in the face of the developing crisis in science teaching.

During this period, a strong program for science education was developing in the Office which resulted in two basic studies on science teaching in the secondary schools. The first of these by Dr. Philip Johnson, "The Teaching of Science in Public High Schools" was published as Bulletin 1950, No. 9. The second study by Dr. W. Edgar Martin, "The Teaching of General Biology in the Public High Schools," was published as Bulletin 1952, No. 9. Other science education services established during this period were the "Selected Science Services" under which title

[1] Public Laws of the United States of America, Passed at the second session of the thirty-ninth Congress, 1866-1867; Chapter 158, Vol. 14.

several bulletins useful to science teachers were published, and the "Annual Collection of Research" in science teaching established in cooperation with the National Association for Research in Science Teaching. Each of these services is continuing under the present program.

In 1951, the Office of Education, together with the Cooperative Committee of the American Association for the Advancement of Science, called a conference in Washington to consider the problems of the growing scientific manpower shortage. Scientists and educators from many parts of the country attended. The published deliberations of this conference contained recommendations which are presently being implemented in the programs of several agencies concerned with the current crisis as well as in the continuing program of the Office of Education.

In planning the current and projected program of the United States Office of Education in science education, an attempt is being made to build on the foundation of the activities reviewed above and to take into account new factors which have developed. The shaping of the ongoing program is the result of the efforts of the Specialists for Science, the concerted efforts of many individuals representing other curriculum areas and especially through understanding and cooperative administration in leadership. An attempt is being made to keep the science problem in perspective and balance with respect to other areas of the school curriculum.

A basic responsibility of the Office of Education is the collection, analysis, interpretation, and dissemination of factual information on the status of American public school programs of education. Over the years the Office has built up a fund of facts and statistics, of information and knowledge about education that is national in scope and impartial in its objectivity.

Following is a brief summary of the science education program in the United States Office of Education.

1. *Projects now in progress*:
   a) *High school enrollments in science and mathematics.* This study was first carried out in 1954–55. Data are currently being collected and processed on a repeat study for the school year 1956–57. It is planned to repeat this study every two years for the duration of the crisis in science teaching.
   b) *The qualifications and teaching loads of high school teachers of science and mathematics.* A pilot study is now in progress in three states. This study may later be expanded into a national study.
   c) *Status study of the teaching of science and mathematics in the public high schools of the United States.* This will be a major study involving all aspects of the teaching of these subjects. This study is planned as the first in a series which will be repeated at intervals to begin the accumulation of a body of facts from which trends may be more reliably assessed.

d) *Selected Science Service circulars.* This series of bulletins was started several years ago. The circulars are based on topics and needs of science teachers and directed toward the general improvement of science teaching. They are available for free distribution.

e) *The collection and evaluation of research in science education.* This project is carried out annually in cooperation with the National Association for Research in Science Teaching. The reported studies are published in a bulletin and are available for distribution.

f) *Cooperative efforts with other governmental agencies.* The Specialists for Science and Engineering work closely with such agencies as the National Science Foundation, the National Academy of Sciences, the Atomic Energy Commission, and the National Committee for the Development of Scientists and Engineers.

g) *Cooperative efforts with non-governmental agencies and organizations.* The Specialists for Science and Engineering Education work cooperatively with such groups as the Association for Engineering Education, the American Association for the Advancement of Science, the National Science Teachers Association, the American Council on Education and others concerned with the problems of science teaching.

h) *Cooperation with state and local school systems.* Many state and city school systems are carrying out studies and other activities aimed at the improvement of science teaching. The Office of Education keeps in close touch with these efforts and the Specialists frequently serve in consultant roles, and participate in workshops and institutes conducted by various groups.

2. *Projected Plans*:

a) *A status study of science and mathematics education in the public junior high schools of the United States.* This study is currently being planned as the second in the series of status studies to be repeated at selected intervals in the attempt to build a basis of cumulative data.

b) *A status study of science and mathematics education in the public elementary schools of the United States.* This will be the third study in the planned series to be repeated in the cycle mentioned above.

c) *A study and evaluation of current offerings and practices in science teaching.* This will be a study based on state and local publications of course of study, curriculum guides, etc.

d) *Cooperative research with state and local school systems.* Plans are presently going forward for cooperative projects in science and other subjects to be carried out in cooperation with state and local school systems.

e) *A study of teacher education programs in science.* This study is projected as a cooperative effort with the Division of Higher Education at the United States Office of Education.

This has been an attempt to summarize the current and projected plans of the United States Office of Education to assist in meeting the present and continuing crisis in science education.

ENGLISH MOST VALUABLE VOCATIONAL SUBJECT IN CURRICULUM

San Francisco, Dec. 26, 1956—English is the most valuable course of study in the average college curriculum both to a business career and to the enjoyment of leisure time. This is based on a survey just completed by the General Electric Company of more than 13,000 of its college graduate employees.

Dividing the employees polled into the broad categories of engineering and non-engineering graduates, the company found that non-engineering respondents placed English first on the list of subject areas that contributed most to career success, while engineering respondents placed it second only to mathematics. Both groups voted English literature the most important subject for leisure time activities.

In addition to English communication (both written and oral) and mathematics, both groups cited physics and economics as important to career success. These four subjects were considered to be of extreme value regardless of the respondent's academic background or type of employment, reported Kenneth G. Patrick of New York City, manager of General Electric's Educational Relations Service, which conducted the survey.

The survey revealed the least valuable subject areas, judged from a career standpoint alone, included history, foreign language, miscellaneous sciences (biology, botany, geology, etc.) and certain social sciences. Some indication was offered that techniques of teaching certain courses left much to be desired, particularly in the social science area where attention was often directed to theory at the expense of practical applications, Patrick said.

"It should be borne in mind that these subject areas were reported as least valuable from the career standpoint only, which is no indication of their over-all value to the educated man," he emphasized.

Following English literature in contribution to leisure time, both groups cited the value of history, science and engineering, economics, physics, mathematics, and philosophy. Liberal arts graduates tended to indicate a greater breadth of "value courses" in the non-science areas.

In summarizing the general findings of the survey, Patrick said that the subjects mentioned most frequently for success in a business career "could be interpreted as a strong vote of confidence for a broad liberal education with specialization, if any, occurring at the graduate level."

Respondents found it difficult to decide whether teaching personality or subject matter had been of more lasting influence, Patrick noted. Subject matter was judged the most influential by a slight majority of both engineering and non-engineering personnel.

A Science Teacher's Analysis of the Challenge

By MARGARET NICHOLSON*

The high school science teacher cannot help but be aware of the need to encourage more of his students to follow careers in science. We read that the United States has an unfulfilled demand for 50,000 additional scientists and engineers.[1] We are told that a major cause of scientific and technical manpower shortage in this country is the failure of high schools and elementary schools to arouse interest in and enthusiasm for scientific work.[2] We hear of the tremendous numbers of scientists and engineers being trained in other countries; that in Russia, for instance, before completion of high school, the student will have five years of physics, five years of biology, four years of chemistry, and ten years of mathematics.[3] In fact one can hardly open a magazine without finding an article relating to this problem. We read: "Classroom Cold War; We Need Scientists and Engineers"[4] and "Researcher Shortage Threatens U.S. Future"[5] and "Industry's Frantic Pursuit of Talent."[6]

Thus challenged we must seek a solution. This solution, however, cannot be inconsistent with our belief in the principles of democracy. We feel that the type of person who makes a real contribution to scientific progress will not result from state pressure, that his abilities cannot be poured into a mold that turns out scientists on an assembly line. We believe that each person has the right to develop to his highest potential as an individual and that future scientists and nonscientists alike profit from science as a part of the total educational program. This is the greatest challenge for science teachers in the present day: *that science be an integral part of a liberal education.* "Science should be discussed not in the light of the new technology to which it may lead, but for its own sake—as a method of thinking, as a method of acquiring new knowledge, as the key to understanding, the road to comprehension of the physical world."[7]

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[1] National Association of Manufacturers. "Tomorrow's Scientists and Engineers, A Survey of Industry's Support of High School Science," No. 2, 48 St., N.Y.

[2] Arnold O. Beckman, Beckman Instruments, Inc. in an address to a section of the California State Chamber of Commerce 29th Annual Convention, November 1956.

[3] *Chemical and Engineering News.* Nov. 19, 1956. Vol. 34, No. 47. p. 57222. "Russia's Three R's."

[4] *Scholastic,* Dec. 8, 1955.

[5] *Nation's Business,* August 1955.

[6] *Newsweek,* April 2, 1956.

[7] Dr. Lee A. DuBridge, "Science, the Endless Adventure" condensation of an address at the 94th Annual Convention of the National Education Association, July 1956 in *The Science Teacher,* 1956. Vol. 23, No. 6.

The curriculum of science offers unlimited opportunity for the education of the individual. Its subject matter is adapted to the development of problem-solving techniques, not just to subject learning. Reading, writing, and arithmetic become tools for that all important fourth "R," reasoning. Logical methods of both thought and work may be developed. Keenness of observation, accuracy of reporting, organization of information, suspension of judgment, selection of pertinent facts, and both inductive and deductive reasoning become part of the problem-solving techniques that may be worked on during scientific study. Many opportunities are provided in the practice of the critical thinking so necessary for one to be educated to live in the present age.

No one can possibly keep fully abreast of the knowledge accumulated in the world today. Therefore, it becomes increasingly important that students learn how to use their learning. This may be done in almost any field, but science offers more chances than most others. Not only can the student learn from others but he can make his own discoveries by observation in the world around him and in the laboratory. Besides being a place for discovery, the laboratory offers physical as well as mental activity. Development of skill is both a satisfaction to the individual and a part of his well-rounded education. The student learns to use a microscope, a Bunsen burner, a chemical balance. He becomes skilled in dissection, in titration, in the measurement of density. The laboratory also offers chances for participation as part of a team with resulting appreciation for the contributions of others and for the importance of one's own part.

These features that make science courses especially important as a part of the general education of all students certainly do not negate the fact that a high school science course is often the first step toward a career. Science teachers are faced with a dual role, the same dual role that has always been inherent in high school science but which is perhaps more clearly recognized: the role of furthering the education of the nonscientist to enable him to live in a world of increasing scientific complexity and at the same time the role of stimulating the potential scientist to continue and to develop in the field of his inclination. How best accomplish both of these despite the pressure for larger classes, the handicap of less room, and the need for greater economy?

First, we must utilize to the fullest those aspects that are unique in science teaching, the laboratory, work with actual substance as opposed to reading and talking, and the development of critical thinking. Techniques of teaching these things need improvement. It is far easier to teach facts than to teach methods of thinking; far easier to follow a "cookbook" routine than to use situations for teaching critical thinking. There is need to learn more about teaching problem solving and ways for evaluating success in such instruction.

Better teaching will make science courses more valuable to all groups of students. In thinking about careers in science remember that every stuent is a potential part of scientific manpower. For every research scientist

or engineer there will be five to ten technicians and fifteen to twenty semi-technical workers. The vocational choices of these students and their attitudes toward vocations are growing concepts influenced not only by the science program itself but by other features as well. Certainly not the least of these influences is the interest of the individual teacher in the individual student. The standards and attitudes developed in the noncollege preparatory group and in the group preparing for brief technical training are fully as important as those developed in students proceeding to a more advanced level. All students should have adequate opportunity in both physical and biological science. Teaching must be equally interested in students at all levels of performance.

Most high school students are eager for knowledge; they want to think. They have intellectual as well as physical energy and thrill to the excitement of discovery. They need courses with sufficient depth. Dr. Obourn of the United States Office of Education emphasizes a need for "stiffening the batter" in science instruction.[8] Each school may work out its course content and titles in a different way but it behooves each teacher of science to see that as many as possible of his students find courses to meet both their needs and their interests. This may be achieved by survey or by specialized courses, depending upon the philosophy of the particular school. But the science teacher must recognize that the methods of science are more important than mere accumulation of facts.

The foregoing is especially important in relation to those students especially gifted in science. Some programs, science fairs, special contests, science club work, are an outside impetus for these students. But more development of their abilities is necessary in the science curriculum itself. Some schools allow these students to enroll in courses a year earlier (i.e. chemistry as a tenth rather than as an eleventh-grader). This makes possible the inclusion in the curriculum of senior science courses of a more specialized and advanced nature. Some schools have set up a different curriculum with courses permitting independent research for these students. Others have encouraged the enrichment of existing courses and more participation in science clubs and projects. Whatever method used, these students must be given stimulating material to hold their interest and to prepare them for college work. Some colleges, recognizing the greater achievement of these students, give them course credit and allow them to go on to advanced work more rapidly. Another way of motivating these students is for the high school teacher to carry on some research of his own. Progress may be slow but knowing about it in process can be very exciting to the student and also stimulating to the teacher.

In working toward general improvement of the high school science program, help can be provided for the program in elementary schools. One should not be too critical of science in the elementary schools when the difficulty of securing adequately trained teachers to meet the needs of in-

[8] Dr. Ellsworth S. Obourn, Specialist in Science, U.S. Office of Education, in an address at Mills College, December 1, 1956.

creasing enrollment is recognized. But there is no doubt that many elementary school teachers need help with science teaching. The high school teacher may serve on a committee for curriculum planning, may give practical instruction in teaching methods and course content, or may supply materials for demonstrations and laboratory work. Sometimes superior students, as part of their high school program, have worked out units of instruction complete with materials in the form of a science "kit" or have gone into the elementary class to present a program. Whatever form it takes, the sincere interest of the high school teacher in the elementary program cannot but have beneficial effects.

The high school teacher has many opportunities to improve his own professional qualifications. Many colleges and universities have special summer programs and conferences. Summer employment available in many industries stimulates professional growth and offers monetary advantage. Many organizations have programs from which the teacher can benefit. We can improve ourselves, encourage our colleagues, put pressure on administrators to employ only well-trained science teachers. Emphasis must be placed on having a well qualified person for every high school course in science.

This points up the problem of the shortage of well-trained science teachers. As the need for scientists has become acute, employment in scientific industries has become so increasingly attractive that many who might otherwise have considered teaching have not done so. It is more important than ever that students be encouraged to choose the teaching profession. Such encouragement often comes from the satisfaction students obtain from thorougly enjoying a high school course, which is the aim of every high school science teacher. A more tangible suggestion is to discuss the possibility of teaching with those who appear to have the ability and by allowing them to assist in teaching situations both in their own and in other classes.[9] Sometimes the success of a lesson well presented by a high school student may be the turning point in his decision. In this choice of a vocation, as in other areas of science, the influence of the individual teacher seems to be the strongest single factor.

In the recruitment of an adequate supply of good teachers, increased professional status is very important. For this a good relationship between the school and the community is essential. Here high school science has a unique position. When community resources, both industrial and individual, are made use of, the community gets a chance to understand more of what the school is doing and the school program is enriched in many ways. When they visit a local industry, students see uses for many of the things they are learning and are stimulated to learn more. They also have a first-hand contact with many vocations. Some high schools have profited by having a committee of scientists who live in the area and assist in planning programs, developing student projects, and supplying materials

[9] See article by Betty Lund, "Future Teachers in the Making" in this issue of the *Journal*.

and information directly to the teacher. In these interactions between the school and the community both are sure to benefit. The students come to a realization of the tremendous part that science plays in life today and the citizens come to a realization of the part that education plays.

The high school science teacher is part of a typical cycle. In using community resources he improves his teaching, and improving his teaching he not only aids all of his students but encourages more to enter the various fields of science. With more pupils entering these fields, community resources are improved which he in turn can use to improve his teaching. Recognition of the basic position of science in the world leads to recognition of the necessity for excellent science teaching at all levels of education and in the lives of all students. If teachers of science take the initiative in improving all phases of science teaching, this will inevitably encourage not only more but abler students to follow careers in science. "Interest and facility in mathematics and science are created by fine teaching; by intelligent, sympathetic interest in the individual, by uncovering and stimulating of exceptional talent, by making the subject matter exciting rather than dull."[10]

[10] Dr. Lee A. DuBridge, *op. cit.*

FORESTRY CAREER INFORMATION AVAILABLE

Information on forestry as a professional career is being made available by the Northern California Section of the Society of American Foresters. A new leaflet, "Careers in Forestry," has been published and a group of professional foresters is available for counseling service.

"Careers in Forestry" describes the work of a professional forester, tells of employment opportunities and salary scales, gives a suggested forestry-preparatory program for high school students, lists entrance requirements for seven western forestry schools, discusses transferring from junior college, and describes scholarship opportunities. It was published with the cooperation of the State Department of Natural Resources. Copies are available from that agency.

A Committee for Professional Forestry Career Counseling has organized a counseling service in Northern California. Its objective is to get a better understanding of the field of professional forestry and to attract outstanding students to the profession.

The following foresters will be pleased to arrange for a forester to talk with teachers and students anywhere in Northern California:

Bernard Z. Agrons, Box 369, Rockport; Charles Arment, The Diamond Match Co., Chico; William H. Hansen, U.S. Forest Service, Fresno; Wayne Hubbard, 1903 Capitol Ave., Sacramento; William Maguire, California Division of Forestry, Camino; Jack Schoening, Shasta Forests Co., Box 898, Redding; Prof. John Zivnuska, School of Forestry, University of California, Berkeley 4, Calif.

Further information available from George A. Craig, 6301 Third Ave., Sacramento 17.

A Science Teacher Speaks Out

By CHARLES E. MERIDITH*

Any proposal of a program to meet expanding needs for trained technicians and engineers should be comprehensive in its view for this is a many-faceted problem. Stated simply, the problem is to arouse the interest of students in the various fields of science, to develop their interests into knowledge, and finally to bring their knowledge to fruition in the form of lives of service in the constantly expanding fields of science and mathematics. Attention will be focused upon the role of the high school teacher in the physical sciences.

Effective contributions can be made by those secondary school science teachers who appreciate the value of the interest in science that is so frequently shown by elementary school children in the middle and upper grades. In attempting to direct and to use such interest, the high school science teacher has unique opportunities. Many elementary school teachers find themselves hard pressed to cope with questions of what, how, and why that arise as the result of children's varied experiences in this science-oriented world of today. Many skillful elementary school teachers quickly admit their inadequate background in science but hesitate to ask their secondary school colleagues for assistance. The general acceptance of science as an essential part of the elementary school curriculum is a relatively recent development and has not yet won sufficient prominence in teacher education or in classroom practice. The professionally prepared secondary science teacher has an unparalleled opportunity to serve as a resource for teachers and pupils who are seeking to locate relevant available sources of information. Dividends in the form of greater student interest and information in science will more than adequately repay the science teacher's investment of time.

High school science teachers will be rewarded by the development of science interests in elementary school children. Encouragement of earlier explorations in the fields of science provides opportunity for investigation and pursuit of those interests that have the strongest appeal to individual children. Such pupils carry with them into high school more clearly defined purposes directing their study. Students entering high school science classes with a wide background of science concepts and principles provide the basis for greater development than would otherwise be possible. One of the more important gains is the earlier incorporation of more scientific terms into written and spoken vocabularies as a result of their use in written reports and class discussion.

Secondary science teachers who have recognized the almost universal interest of younger children in science are often perplexed by the question: "What happens to that interest when these same pupils enter high

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school science classes?" A high school science teacher may not be aware that the blighting of interest may result from his own philosophy and methods of instruction. Interest in science is rarely aroused by exposure to an avalanche of facts whose interrelationships and relevance are poorly defined by the teacher and dimly apprehended by the student. All too often facts and the problems derived from them in the classroom are relevant only to the world of the textbook which sets the scope of what is taught. High school texts in the physical sciences are merely dilutions of first-year college level texts which have seldom enthralled their readers. Can a high school science teacher expect to maintain the interest of today's youth by a modified and encapsulated recapitulation of his own college science courses?

Science courses planned to use the interests and meet the needs of today's youth will be centered around key developments in current science. Use of the criteria of present relevancy and student interest in making the selection of content and methods of instruction will markedly affect a high school science course. For example, a consideration of the principles of construction and operation of jet engines ought to take precedence over a discussion of the fast-fading reciprocating steam engine traced back to Watt and Newcomen. While a knowledge of the history of science has value in the development of a perspective in science, it is indefensible to exclude or abbreviate the consideration of current developments in favor of background discussions of superseded principles and devices. Since no one denies the impossibility of including a major fraction of known science in one course, or combination of courses, it would seem the better part of wisdom to abandon any attempt to be encyclopedic. The fundamental procedure should be to begin with that science knowledge which is most essential to modern living, proceeding to nonessentials only when the field of essentials has been exhausted.

Analysis of even the best high school science text reveals a paucity of material on recent developments in the physical sciences. The alert teacher will make extensive use of the several periodicals that are devoted to science news and feature articles in various fields of special current interest. Free and inexpensive science materials that are ever-increasing in both quantity and quality can serve as important resources for classroom use. Not only are numerous attractive materials suitable for classroom use available from industry, but there are also many inexpensive publications of national and state governmental agencies. Daily newspapers, radio and television broadcasts abound with applications of scientific principles. The classroom use of mass media of communication provides the teacher with unusual opportunities for teaching the basic skills involved in evaluating the reliability of information derived from various sources.

Of primary importance is the obligation of a science teacher to keep informed concerning new principles and techniques in science. Problems selected for attention in his classes will then be directed toward the world of experience of his students and directly related to situations they would encounter in their future careers in science. A science teacher oriented

toward modern methods will encourage research and problem solving by individuals and by groups—especially the latter. The emphasis in his teaching will reflect his recognition that the research team has come increasingly to characterize the method of attack in science today.

News accounts of current developments in the whole realm of science, from medicine to astronomy, are replete with instances of statements of principles that are not in accord with previously accepted "facts." In contrast with the changing nature of scientific knowledge, much of teaching in science consists of presenting immutable "facts," which are, however, not a "given" in nature but rather formulated hypotheses based on incomplete evidence. Many of the most important scientific discoveries were at first classified as being in the realm of "error" by those who espoused the previously defined "correct" statements of principles. Rigidity of habitual patterns of thinking by a science teacher can have far reaching consequences for what is learned by students in his classes.

Science teachers who recognize that science concepts and principles are constantly open to revision may be instrumental in stimulating rather than repressing the analysis and selective synthesis in thinking that characterizes the derivation of many new principles and techniques. The technicians, inventors, and research workers of tomorrow are in classrooms today; teachers must not discourage original thinking by students who do not see the world solely in terms of facts to which teachers have become accustomed. At this point the role of the science teacher may indeed be a crucial one.

The observant science teacher will be quick to recognize students in his classes who exhibit interest and promise of ability in various fields of the physical sciences. The instructor will take every opportunity to point out the wide range of opportunities for careers based on applications of the various principles and devices studied. Working in cooperation with the guidance staff of the school, the teacher should encourage students to investigate occupational opportunities, the training and other requirements requisite for professional careers. Many professional and industrial associations have prepared pamphlets that present discussions of training programs and other requirements for those who are considering careers in engineering, chemical industries, pharmacy, electronics, and other allied fields. The science teacher can make arrangements for students to visit local professional and industrial enterprises. This may lead to student part-time employment; experience can be a powerful factor in clarifying occupational choices.

As a capstone to the entire program there should be periodic follow-up studies made of students who were encouraged to pursue careers in science fields. Such studies, made at the end of the second and fifth year after graduation from high school, can be of great value in assessing the effectiveness of the high school science program in meeting its educational goals. This would help to establish some measure for determining the degree to which the program is successful in meeting the challenge of America's expanding frontiers of science.

NEW PUBLICATIONS

New books and other publications recently received in the *Journal* office:

Gordon, Ira J. *The Teacher as a Guidance Worker.* New York. Harper Bros. 1956. 350 pp. $4.50.

Graff, Orin B. and Street, Calvin M. *Improving Competence in Educational Administration.* New York. Harper Bros. 1956. 301 pp. $4.00.

Krug, Edward A.; Babcock, Chester; Fowlkes, John Guy; James, H. T. *Administering Curriculum Planning.* New York. Harper Bros. 1956. 324 pp. $4.00.

Van Engen, Henry and Gibb, E. Glenadine. *General Mental Functions Associated With Division.* Cedar Falls, Iowa. Iowa State Teachers College. (Issue No. 2) 1956. 181 pp.

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